The Builder.

VOL. XLVII. No. 2183. SATURDAY, DECEMBER 6, 1884.

ILLUSTRATIONS.

Church of La Madeleine, Vézelay: Bosses from the Vault of the Ancient Sacristy.—Drawn by M. Adolphe Guillon 758, 759
Additions to a House, Tunbridge Wells.—Mr. M. E. Macartney, M.A., Architect 762-763
South Transept, Westminster Abbey: Triforium of South Wall.—Drawn by Mr. G. J. Oakeshott 766-767
East Sussex, Hastings, and St. Leonards Infirmary (Plans, 770).—Messrs. Keith D. Young & Henry Hall, Architects 771

CONTENTS.

Leonardo da Vinci as Architect 749
The Storage of Water 750
Architectural Discoveries at Delos 751
Notes 751
The Country Builder 753
The Aphrodite of Cnidus 754
The Society of Painters in Water-Colours 754
The Institute of Painters in Oil-Colours 755
The Internal Architectural Treatment of Cupolas: Royal Institute of British Architects 755
The Drainage of Private Houses 756
Carved Bosses from La Madeleine, Vézelay 773
Shandon Court, Tunbridge Wells 773
Triforium, Westminster Abbey 773
East Sussex, Hastings, and St. Leonards Infirmary, Hastings 773
The Plumbers' Company and Technical Education 773
British Museum Lectures 773
Architectural Societies 774
Roberts's Rain-water Separator 774
Arab Art 774
The Dome of St. Paul's 775
The Waterloo Well, Kilburn 775
Leasehold and Freehold Tenures 775
Stone Bridges 775
Church-Building News 775
Dissenting Church-Building News 776
Stained Glass 776
Provincial News 776
The Student's Column: Iron Roofs.—II. 776
Recent Patents 777
Recent Sales of Property 778
Meetings 778
Miscellanea 778

Leonardo da Vinci as Architect.

UNDER this title comes to us a publication of great interest, though in a form which is somewhat puzzling to the reader. There are some things which we manage best in England, and one of them is the arrangement and "entitling," if we may use the term, of architectural publications. We can generally at least make it clear who a book is by, and what it is about; but French and German editors and publishers despise these ways of pleasantness. They delight in preparing puzzles for the reader; in sending out the last part of a book first, placing the title-page at the end and the index in some unexpected place in the middle, and so on. The present volume* is no exception to this pleasing rule. The outside cover bears the title as given below, but no date or publisher's name, only an announcement that "this treatise forms part of the literary works of L. da Vinci, by Jean Paul Richter, and has not appeared separately." On the inside title-page we find this latter title, and the notification "Vol. II.," the name of Messrs. Sampson Low & Co., as publishers, and the date 1883. Then follows the table of contents of "Vol. II.," which, however, is not the table of contents of the volume before us, and seems to have nothing to do with it; and then an index of the contents of plates from numbers LVI. to CXXII., whereas the plates actually appended to this volume range from LXXVII. to CVI., and the contents of some of them correspond to the descriptions under the same number given in the index, and in other cases do not. After this we give it up, and have to be content with the vague conviction that it is a volume containing a number of fac-similes of rough sketches by Leonardo, of great interest, preceded by a good many pages of desultory remarks, some of which obviously have some reference to the plates; but further than that we cannot get.

What can be extracted from these facsimile sketches, and the hasty memoranda of Leonardo, which latter are printed in double columns of Italian and English, is of much interest, partly in its inherent suggestiveness, partly as throwing light on the character of Leonardo and his way of regarding things architectural. Baron de Geymüller remarks in some prefatory notes, that in spite of the prevalent idea as to Leonardo's architectural acquirements, partly based on the famous letter in which he practically undertook to do everything that could be required and some other things besides, no building is known to have been planned and executed by him. But certain documents, preserved at Milan, show that Leonardo was not only employed in preparing plans, but that he took an active part as member of a Commission on public buildings (which in those days seems to have presupposed some knowledge of the subject); and that his name is linked with the history of the building of the cathedrals both of Milan and Pavia. The evidence that he gave a great deal of thought to architecture is obvious enough from the sketches and the notes included in this volume, though they are very desultory and the sketches in many cases exceedingly slight. The compiler observes:—

"Leonardo's writings on architecture are dispersed among a large number of MSS., and it would be scarcely possible to master their contents without the opportunity of arranging, sorting, and comparing the whole mass of materials, so as to have some comprehensive idea of the whole. The sketches, when isolated and considered by themselves, might appear to be of little value; it is not till we understand their general purport, from comparing them with each other, that we can form any just estimate of their true worth. Leonardo seems to have had a project for writing a complete and separate treatise on architecture, such as his predecessors and contemporaries had composed,—Leon Battista Alberti, Filarete, Francesco di Giorgio, and perhaps also Bramante."

The compiler, however, seems doubtful about this, and certainly there is nothing in most of the notes here printed to suggest any such general and comprehensive scheme. They seem rather the thoughts and jottings of an eager comprehensive mind that could never be without employment and speculation, and was constantly trying to solve some knotty point in art or science as it presented itself to him.

The contents of the work divide themselves naturally into two sections—sketches, and theoretical investigations and memoranda. In both we find plenty of traces of what we venture to think a characteristic of Leonardo's genius and character, viz., a certain eccentricity, a bent towards out-of-the-way solutions and unusual methods, a tendency towards ingenuity rather than really practical invention, which argues a certain want of the true *mens sana*. In these sketches, for instance, the remarks and comments are nearly all written backwards way, from right to left, so as to read right only in a looking-glass. That is Leonardo da Vinci all over. He never could be content to do an ordinary thing in an ordinary way: he was always wanting to outshine others in mere cleverness, even when nothing was to be gained by it. So with some of the constructional ideas, the sketches for which are reproduced. One of the first is a design for a system of navigable canals under the streets of a city, the canals communicating with the basements of the houses, which are flooded with water and vaulted. Another sketch shows a kind of tower loggia built over water, with a fountain in the middle of the upper floor, which is to be kept supplied by a turbine-wheel outside, actuating, by long levers, pump-rods, which are carried down the insides of the columns of the loggia stage. Apparently, the pumps deliver first into a large cistern on the top, over the whole area of the building, and carried only on the rather widely-spaced colonnade of the loggia; an incident which seems to show that Leonardo had very indifferent notions as to the weight of such a mass of water. Some of Leonardo's practical drawings for engines of war and other such things were shown at one of the Winter Exhibitions at Burlington House some years ago, and we commented on them at the time. The practical designs in Baron de Geymüller's book produce the same impression which the Burlington House drawings did; they seem the productions of a very active and inventive, but certainly not a soundly practical mind. They are all very interesting on paper, yet they all leave a doubt whether they would work, or whether they would be of any good use if they did; and in many cases, as in that of the fountain loggia aforesaid, the elaboration of the means is ludicrously disproportionate to the end to be attained. The written memoranda on practical architecture which are here published form a curious mixture of really practical suggestion with often illogical and untenable theory, introduced by his favourite formula "and this can be proved" (*e questo si prova*); the "proof" consisting usually of a simple statement of supposed facts evolved out of his fertile and imaginative brain. The memoranda on the value of the arch are very curious in regard to their generally true conclusions and the empirical way in which these are expressed. "The arch is nothing else than a force originated by two weaknesses [*causata da due debolezze*], for the arch in buildings is composed of two segments of a circle, each of which being very weak in itself tends to fall, but as each opposes this tendency in the other, the two weaknesses combine to form one strength." Elsewhere he puts it differently; if the space to be bridged over be 20 in measurement, and the material of the arch 30, it is obvious that 30 cannot fall through 20. From some memoranda on the pointed arch it is evident that he was alive to the fact of the superior resistance of the pointed arch at the crown, as compared with the round arch. Some of the numerous notes on cracks and fissures in walling are of interest, and are more practical than the other practical

* Leonardo da Vinci as Architect. By Baron Henry de Geymüller, architect.

memoranda. "A wall which does not dry uniformly in an equal time always cracks. A wall, though of equal thickness, will not dry with equal quickness if it is not everywhere in contact with the same medium. Thus, if one side of a wall were in contact with a damp slope, and the other were in contact with the air, then this latter side would remain of the same size as before; that side which dries in the air will shrink or diminish, and the side which is kept damp will not dry." Another remark to be noted is "When the crevice in the wall is wider at the top than at the bottom, it is a manifest sign that the cause of the fissure in the wall is remote from the perpendicular line through the crevice," which in a general way is true enough. Leonardo does seem to have projected an elaborate essay on this subject of cracks, as the notes commence with the mem.,—"First write the treatise on the cause of the giving way of walls, and then separately treat of the remedies." He contradicts himself rather about the method of building walls to ensure stability, in one place stating that "walls must be built up equally, and by degrees, to equal heights all round the building, and the whole thickness at once, whatever kind of walls they may be"; but in the very same chapter he lays down positively that "walls should always be built first and then faced with the stones intended to face them, since the wall settles more than the stone facing,"—a direction which at once carries the mind to that architecture of veneering so prevalent in Renaissance Italy. In another place, in regard to the resistance of beams, he carries us to the subject of building to resist earthquakes, on which we said a few words the other day. After observing that "the part of a beam built into the wall should be steeped in hot pitch and filleted with oak boards [*fasciatia d'asse di quercia*] likewise so steeped," he continues, "Each beam must pass through its walls and be secured beyond the walls with sufficient chaining, because in consequence of earthquakes the beams are often seen to come out of the walls and bring down the walls and floors, whilst if they are chained they will hold the walls strongly together, and the walls will hold the floors."

On the whole, it does not seem that the suggestions of Leonardo on constructional matters will be of more value to modern students than as curiosities of a great man's mind. Where they are at all novel they are mostly rather doubtful; where they are not they serve now only to show how much, with all his wild and ambitious genius, he was alive to and interested in small practical details, as in his direction that "all privies should have ventilation [by shafts] in the thickness of the walls, so as to exhale by the roofs"; and "the privies must be numerous and going one into the other in order that the stench may not penetrate into the dwellings, and all their doors must shut themselves off with counterpoises"; swing doors, in fact, with spring hinges. But the interest is much greater when we come to the artistic side of the architectural notes. Here we are at once struck by the boldness of many of the sketched suggestions, and the genius which shines through these rough and sometimes hardly intelligible pen sketches, which are accurately reproduced in Baron de Geymüller's plates, even down to the tone and the stains on the paper. A considerable number of the plates are occupied with studies for various treatments of the dome and its substructure. They are almost all based on the Greek cross idea, Leonardo evidently regarding the dome as the proper culmination of a wide rather than a long plan, spaced equally on all sides, and nowhere advancing far in front of the base of the dome. He places the dome as the culmination of a square, a circle, an octagon, in various ways; he surrounds it with semi-domes, niches, and minarets, leading up in pyramidal composition to the central cupola. These combinations are not all equally happy; but they nearly all suggest ideas capable of being further worked out. They are in nearly every case accompanied by carefully sketched plans, sometimes by perspective sections. Some of them are rather Oriental in appearance; the combination of the dome with various semi-domes almost inevitably leads to this Eastern feeling. He has one or two sketches for a dome over a Latin cross plan, but this is evidently no more a favourite combination with him than it was with Wren, who would have so much preferred to carry out the Greek cross plan for St. Paul's. One or two points in connexion with these dome studies are worth notice, as of special interest in relation to St. Paul's. One is a section, on larger scale than usual, of a lofty domical lantern of elliptical outline, the larger axis of the ellipse placed vertically, surmounting a dome the upper portion of which only is shown. The space behind the haunches of the dome, from which the inner cupola of the lantern springs, is apparently treated on the cellular system; the voussoirs of the dome are shown carefully joggled together; but the remarkable point is that Da Vinci seems here to have partially anticipated Wren's contrivance of the cone to carry the lantern, for from the lower part of the haunches of his dome springs a straight course of masonry, forming an oblique line from the haunch of the dome to the base of the inner cupola. The cupola lantern, again, is in two masonry domes, one within the other, of slightly differing section (the outer one spreading more widely at the base), and again there is this oblique wall from the haunch of the inner cupola to the drum of the outer cupola, carrying part of the weight of the inner cupola to the outer part of the dome. Another point to which the compiler calls attention is that in some of these dome sketches not only are the domes decorated externally with vertical ribs, but also with horizontal courses or strings one above another. It is true these are in most cases very slightly marked, and the compiler, perhaps, makes a little too much of the point; but it is of some interest at the present moment in reference to the "zone principle" of decorating domes which is being discussed.

Baron de Geymüller considers Da Vinci to have been in considerable architectural relation with Bramante, and to have been influenced by him in the style of those architectural compositions of which he has left sketches, but which, so far as we know, were never carried out. There are certain sketches for bits of arcuated and dome architecture which certainly recall the manner of Bramante as shown in that remarkable collection of drawings and studies for St. Peter's, the publication of which some time ago we owed to Baron de Geymüller, and which we fully noticed at the time. But these are only a small proportion of the dome studies in the volume; and the majority, except in so far as the dome and semi-dome forms were, of course, there ready to Leonardo's hand, appear to us to display the most remarkable originality, and to be little indebted to the suggestions of other men. The working out of some of them in more finished form would be an interesting task, and we might suggest that it would be a very good subject for an architectural students' competition for the Institute, if Baron de Geymüller, or the publishers, or whoever has the copyright of the sketches, should be willing to permit a limited reproduction or copying of some of them for the purpose.

Among the boldest conceptions in the book is one for a monument. On the top of a great artificial conical mound or hill, suggesting a recollection of the Japanese pictures of Fusiyama, is a circular temple with a colonnade and a central cupola. About one-fourth of the descent the slope is interrupted by a terrace cutting a channel round the hill, with a wall and eight doors, two of which give access to the steps up to the temple, the other six to a series of vaults under the surface of the hill, and not visible in the external design except by their doors of entrance in the wall. The plan of the whole is given beneath.

Some designs for domes, by Leonardo, somewhat similar to those in this volume, were given as a kind of appendix page to the work on Bramante to which we before alluded. We commented on them at the time. Baron de Geymüller is doing most useful and interesting work to architectural students of the Renaissance in thus bringing out to the light the architectural memoranda of the giants of the Italian Renaissance. He has apparently special means of information, and plenty of time to devote to the work, and is doing it in a manner which cannot be too cordially recognised. We are glad to learn that he is engaged on a life of Bramante, which will be a desirable supplement to the drawings previously published.

THE STORAGE OF WATER.

ALTHOUGH it is not often that England suffers from a scarcity of water, such was the case during the past summer in many parts of the country. Instances occurred of water having to be carried long distances for domestic use, and in one case the sum of eighteen shillings per diem was paid for its carriage.

Much might be done in the collection of rain-water to come in usefully at such times of need. In the first place, rain-water is the most useful for household purposes, whether it be for cooking, washing, or bathing, and, when quite clean and pure, it is excellent for drinking. The difficulty is to obtain it clean, for, as the collecting surface is generally the roofs of houses, the water is apt to be tainted with soot, the *débris* of sparrows' nests, dust, and so on. Filtering, however, may do much to remedy the difficulty, as well as such expedients as the rain-water "separator," of which an illustration is given in another column this week.

As the storage of rain-water has been a general practice in the South of France from time immemorial, we propose to give an account of it from our own personal observation, both as regards what may be called the ancient and the modern system of collection. For house use one plan was to collect the roof water and lead it into a tank underneath the house, often made round like an ordinary well, from which it was pumped up as required. This water was beautifully cool and pure, owing to the cleanliness of the house roofs where coal is not used and where fires are comparatively few.

Some months since we went to inspect a large tank that had been made to collect water for irrigation. This tank was about 30 yards by 24 yards and 17 ft. deep. The water coming off a large hill-side was led into it, and the quantity was very great. The tank had cost about 600*l*. The water, coming as it did from the surface of the land, was much discoloured and only useful for irrigation.

We have, however, another property in view where the storage of water, both for domestic use and for irrigation, has been carried out completely, so that an account of the plan there adopted will be the best way of making the matter clear.

Some years ago an English proprietor residing in France built a house on the side of a hill, the geological formation of which was limestone overlying a bed of gypsum and the Red Sandstone. There was a well at the lower part of the property in the gypsum bed, but it was far from the house, and the water was so hard as to render it practically useless for household purposes. It was decided to rely chiefly for water on the rain falling on the roof, and with this object in view a tank was constructed on the hillside some twenty yards behind the house, and a little lower than the level of the roof. Its position was ingeniously fixed so that while it received all the roof water from the house by means of a cast-iron pipe, 4½ in. in diameter, the same pipe delivered the water on the upper floor of the house, whence it was distributed wherever required. After a few years' trial it was found that the roof surface,—some 150 square yards,—was insufficient in a country where rain often ceases to fall for months together, and it was decided to add to it. It may here be mentioned that the house gutters are all covered with galvanised wire netting to keep out dirt as much as possible.

The first point decided was to utilise the surface of the tank itself. This surface, walls

included, being 9 yards by 5½ yards, gave nearly fifty additional square yards. The inside measurement is a little over 23 ft. by 13 ft., and the depth over 6 ft. 6 in. The capacity may be taken at over 12,000 gallons. Experience having shown that still more surface was required, it was provided in the following manner :—The surface of the tank itself was composed of light brick arches on iron joists, covered with rough mortar, which was always coming off in flakes. This, wherever loose, was scraped off, and a coat of the best cement, with a proportion of sand to prevent cracking, was laid on. A fall was made from the four sides to the tank lid, which is about 2 ft. square, and in the centre, slightly above the surface of the tank. Four holes were made in the brickwork below the lid for the water to pass into the tank through galvanised wire netting fixed in the holes to prevent any leaves, &c., from passing. Thus, as before mentioned, an area of 50 square yards was added. It was now proposed to add another area of the same size.

The trees and brushwood having been cleared away from the ground above the tank on the hillside for a distance of about 5 yards by 9 yards, corresponding to the length of the tank, a wall about 3 ft. high was built on the edge, to retain the earth from falling, and for a purpose now to be described. The wall having been completed, a row of tiles projecting about 3 in. beyond its face was bedded in mortar on it, and laid with sufficient slope to enable water to fall clear on to the cemented surface of the tank. A strip of galvanised iron wire netting was laid under the tiles, and turned up in front of them some 4 in. in height, so as to catch any leaves or *débris* of any kind that might fall from time to time. The cleared surface was then covered with sheets of corrugated iron, slightly raised above the ground to prevent injury. These sheets of iron, and the row of tiles provided nearly fifty more square yards surface. Thus the total area gained is equal to nearly 100 square yards. The tank contains between 12,000 and 13,000 gallons ; and as the roof-surface has, at times of heavy rain, more than half filled it, it is presumed that the additional surface now described will quite fill it. For a consumption of 60 gallons per diem, which experience has shown to be the ordinary quantity for a family of five or six persons, there would be sufficient water for 200 days, supposing even that no more rain fell. The figures above given are very nearly correct. Any slight discrepancies will be accounted for by the measurements having been taken in mètres, and the contents in litres, in the first instance.

The supply for the house being provided for, it was thought well to have another tank to supply water for the garden, poultry, &c. This tank is about five yards and a quarter square, and not quite 6 ft. in depth, and holds nearly 10,000 gallons. It is situated about 150 yards from the house, and is supplied from the water running off three roads on the property, sloped to one side, where a paved channel receives the water. There are two small settling-tanks in front of the receiving-tank, notwithstanding which the water is much discoloured owing to the soil being very red in colour. It is, nevertheless, a very useful supply for the purposes for which it is intended, and prevents the house tank being drawn upon for any purpose not strictly household. This tank was exceedingly cheap ; the walls were built of the stone taken out in excavating, and were faced by a brick on edge and a coating of cement. The bottom was lime concrete, with a coating of cement. The whole of the mason work was done by a handy labourer, so there was no skilled labour to pay for. Stone being on the spot, there was no outlay beyond bricks, lime, cement, and labour. No top has yet been added, and the cost has not exceeded 20*l*. The cost of the house-tank has not been reckoned, as it was a necessary appendage to the house in any case, but the work with materials for adding the additional surface of one hundred square yards may be put down at eight pounds, corrugated iron included.

W think we have been able to show that in many cases a good supply of rain-water is easily attainable, and very serviceable. In the instance we quote the comfort of using soft water for bathing and washing is so great that when the supply runs short, and hard water has to be accepted, a general outcry is made. As regards economy, all is in favour of the tanks. The cost of laying a pipe from the water company's main, about 350 yards distant, would have been very considerable, and as, owing to the level, it could not be brought nearer than 100 yards distance from the house, and 60 ft. below it, the difficulty was insuperable.

The question resolves itself very much into the cost of providing tanks ; but on hill-sides, where the collection of rain-water is comparatively easy, and at the same time is most required, stone will in most cases be found in the excavations that will serve for the walls of the tanks.

ARCHITECTURAL DISCOVERIES AT DELOS.

IN a recent number of the *Builder* it was remarked that "architectural subjects do not at present occupy a very large portion of the attention of the Hellenic Society." The reason, perhaps, is not difficult to understand. The Hellenic Society has been, unhappily, up to the present time too poor to undertake extensive excavations, such as are necessary to lay bare the foundations of ancient buildings and recover the scattered fragments which may lead to conjectural restorations. The members of the Society have, for the most part, been compelled to content themselves with working upon the already existing material in their own and other museums, and the *Journal* has published, in the main, small objects of art, vases, painted sarcophagi, inscribed armour, and the like. But for their architectural studies better days are already dawning, and wider fields opening. Once let the Society establish its archæological school at Athens, and England will no longer be backward in the work in which Germany, France, and America have already reaped such rich harvest.

The main work of the French school at Athens has, as is well known, been carried on at Delos, and certainly the "Bulletin de Correspondance Hellénique," issued regularly by the School, does not err on the side of neglecting architectural topics. By far the longest and most interesting article in the latest number now before us is devoted to the elucidation and reconstruction of the architectural remains of a temple discovered in the sacred enclosure (*temenos*) of Apollo.

This temple, M. Homolle thinks, may, almost without doubt, be identified with one of the most famous monuments of antiquity, *i.e.*, the temple containing the celebrated "altar of the horns" (*keraton*). Of the fame of this temple we have abundant literary evidence. Callimachus tells us the story of the building ; how Apollo, who delighted ever in the founding of cities, built for himself with his own hands an altar, laying the foundations in fair Delos, near to the wheel-shaped lake, and how Artemis brought to him from her hunting the horns of wild beasts, and of them Apollo wove the texture of the altar, and round the altar made walls of the horns to enclose it. Ovid, again, makes his heroine Cydippe tell in her letter to her lover how she landed at Delos, and how, while sacrifice was being offered to Apollo, her careful nurse led her through the temple enclosure and showed her the wonders of the place, and chiefly the great altar made of countless horns.

"Miror et innumeris structam de cornibus aram."

Some even think that it was this ancient altar that Homer knew,—"Yet in Delos once I saw as goodly a thing, a young sapling of a palm-tree springing by *the altar of Apollo*." Martial reckons the altar of horns among the wonders of the world. He counts it with the Pyramids, with Babylon, with the Mausoleum.

"Dissimuletque deum cornibus ara frequens."

Many legends gathered about its construction. Plutarch implies that, made of horns only, and of the horns of the right side of the stag's head only, it yet held together in an almost supernatural manner, without any apparent means of fastening. An anonymous author gives another tradition. The altar was made, he says, of the right-hand horns of victims offered to Apollo in a single day. It is needless to say that an altar of so fragile a construction has perished utterly. What M. Homolle thinks he has discovered is the ruin of the building which enclosed the altar, and, no doubt, shared its fame. He has undoubtedly laid bare the complete foundations of a rectangnlar building, divided into three distinct portions,—a sanctuary and a pronaos, between them a very long gallery, the floor of which is of a lower level. The building is of the Doric order, the noticeable part of it being this long gallery. If M. Homolle's supposition is correct, its presence would be easily accounted for. He supposes that the altar itself stood in the sanctuary ; huge blocks of stone still remain there which may well have formed its foundations. The gallery, M. Homolle thinks, was built of such unusual length for the convenience of certain ritual observances. A sacred dance of a peculiar nature was performed in front of the altar of the horns. Tradition said it had been instituted by Theseus on his return from Crete in memory of his escape from the Labyrinth. The dance consisted of certain complicated labyrinthine figures, and was known as the crane dance (*geranos*), probably from a supposed analogy to the movements of flocks of cranes in the sky. A bas-relief, which has unfortunately perished, was found at Delos representing a dance of this nature. The architectural arrangements of this gallery are well suited for a dancing-place, — the sunken part in the centre for the performers, the raised dais all round for the judges and spectators. The general arrangement of the temple will be best understood by reference to the plates which accompany M. Homolle's article. He gives a plan of the actual state of the ruins and a proposed restoration ; also a restored elevation of the interior and a restoration of the roof. About the general arrangement of the temple there can be no doubt, as the foundations are, with some very slight exceptions, intact. Besides the architectural remains a considerable number of sculptured fragments have been discovered, and two immense blocks of marble, part sculptured, part architectural, of the utmost importance. Each of these forms on the one side a Doric half-column, on the other the capital of a pilaster, surmounted by *a kneeling bull*. A Doric column surmounted by a kneeling bull is, in Greek architecture, a startling and unique phenomenon. In Oriental architecture it would not surprise, but the Greeks, as a rule, used sculpture only in the non-operative portions of their buildings ; it served for them a decorative, not a tectonic purpose. So startling an exception demands an explanation, and such an explanation is given by M. Homolle's supposition that we have here the ruins of the temple which had contained the marvellous altar of the horns. There seems little doubt that M. Homolle has given back to us all we shall ever know of one of the wonders of the world. The plans and restorations he gives are an anticipation of a larger work undertaken and approaching completion by the architect M. Nénot.

NOTES.

THE Committee on the treatment of Westminster Hall sat again last Tuesday, when the examination of Mr. Charles Barry was continued. He produced a plan showing the buildings to front St. Margaret's-lane, as designed by Sir Charles Barry, but carried a little further in towards the Hall, so as to allow of a greater width of roadway. This left a court between the proposed new buildings and Westminster Hall of about 60 ft. width at the northern, and 40 ft. width at the southern end, which seems rather too narrow. An alteration in the plan might remedy this. The building

Sir Charles Barry had proposed was of very much the same character architecturally as the present House of Lords building. Mr. Barry expressed a strong opinion as to the insufficiency of the proposed committee-rooms between the buttresses. Mr. J. J. Stevenson was the next witness examined, and gave expression to his well-known views against every sort of restoration, saying that even if Mr. Pearson had authority for every detail, he would oppose the carrying out of the project. The Chairman had the bad taste to ask this witness "whether he had written the article in the *Builder*" (referring to our leader of last week). The incident is amusing, as showing how much at sea the authorities are on these points, as we have always opposed Mr. Stevenson's extreme views, and part of his evidence was in direct opposition to our article; but we think most people will agree with us that it was hardly a fair question to put to a witness.

THE subject has elicited four letters in the *Times* since our last issue, from Mr. Pearson, Mr. Butterfield, Precentor Venables, and Mr. E. W. Godwin. Mr. Pearson's letter is, of course, a defence of his own views, in which he bestows far more attention than was necessary on a foolish letter of Mr. Loftie's some days previously, in which that self-constituted authority asserted that the original architects had "carefully avoided" allowing the roof of Westminster Hall to be seen, which is, of course, simply nonsense. All we complain of in Mr. Pearson's letter is his defence of his committee-rooms, as "large and well-proportioned," which they most assuredly will not be, and his assertion that the adoption of his scheme will be no impediment to the completion of Sir C. Barry's plan. It certainly would be; his north-west building comes right in the way. Mr. Butterfield writes a thorough architect's letter. He says, the roof at present is overpowering, the windows below it mean, the west side sunk in a hole. He would lift the roof and lengthen the windows upwards. He confirms the view that the west side of the Hall has never before been seen as it is seen now. It "must be made presentable," but the particular question of Mr. Pearson's proposals he avoids. We do not think his proposition of raising the roof will be carried out. We quite agree with him that new buildings should not be put up for the mere sake of concealing Westminster Hall. The connexion between the two subjects is only indirect. The Office of Works and Mr. Pearson say "new committee-rooms are wanted, —here they are." We say, those are not enough and are bad in themselves; if you are going to increase accommodation to the extent to which it is really wanted, do it in the proper and only efficient manner, by completing the design of Sir Charles Barry. Precentor Venables's criticism is purely negative, and he, with others, falls into the mistake of confounding the *porte cochère* under the cloister with the horse stand under the grand committee-room. Mr. E. W. Godwin is shocked at Mr. Butterfield's suggestions.

APART from the political effects, to which it is not our province to refer, of the new electoral division of the country, it may be regarded as a step towards what may be called the urbanising of England. The rapidly increasing pressure of population on area must,—if continued long enough,—in time convert a populous island into a group of towns. But the rate of agglomeration varies very much. Towns with fewer than 10,000 inhabitants, as a rule, are now hardly increasing in population. Some of them are actually decreasing, as are some rural districts. As a general rule, the outer ring of the metropolis, and the towns of between 100,000 and 200,000 inhabitants, are most rapidly increasing. Most marked of all is the increase of certain seaports and water-side towns. In twenty-five towns classed as seaports, the increase of houses from 1871 to 1881 was 16·6 per cent. In Great Grimsby it was 71 per cent., and in Barrow-in-Furness 148 per cent in the decade. This determination of the population towards certain centres of activity is a matter of primary importance as regards the building industry of the country, with a general increment which would double the population enumerated in 1881 by the year 1936. The actual rate of urban increase in the number of inhabited houses was 15·6 per cent. in ten years against a rural increase of 11·0 per cent., and in the sixteen towns with populations between 100,000 and 200,000 each, which contain in all 408,000 houses, the increase in the decade has been on the average 21·5 per cent. The town builders are thus those whose activity is most apparent.

THE proceedings of the Boundary Commission, which held its first sitting on December 2nd, will be watched with no little interest by all persons concerned in domestic architecture. The principles laid down for the guidance of the Commission include the maintenance, as far as possible, of existing boundaries; those of parishes being in no case intersected. With this provision, the object of the Commission is to divide the country, as far as practicable, into districts of equal population, —the unit proposed being 54,200 inhabitants per division. It is possible that the influence of this change, as far as it goes, will tend to the multiplication of houses in rural, rather than in urban districts. At all events, the stimulus to urban building which is afforded by the desire to obtain a borough vote, will be weakened. More important, perhaps, than this will be the influence of the new districting of the country in the way of promoting self-government in matters connected with building. At the present time there are instances where the distance of a few yards,—as bringing a site within or without a borough,—makes all the difference as to whether a proprietor can build as he chooses, or whether he is subject to the control,—possibly vexatious, —of some urban authority. These differences will now tend to disappear, and that, we think, to the benefit of domestic architecture.

MR. FERGUSSON writes an article in the current number of the *Nineteenth Century* on the "New Cathedral for Liverpool," dealing with other matters also, but, as far as the Cathedral is concerned, advocating the adoption of a Classic type, and recommending a plan which he had drawn out years ago, as a kind of typical plan for a modern Renaissance church, before any talk had been made about a Cathedral for Liverpool. He places a shallow cupola on a crossing which is nearly a square, the angles only being slightly cut off, and which provides a larger arch on the cardinal sides, in relation to the diameter of the cupola, than in St. Paul's; and he proposes two western towers, somewhat on the type of Wren's Bow steeple, in place of a lofty dome at the crossing. We have a letter also which appeared in one of the Liverpool papers, expressing an earnest hope that "the committee will decide on having a cathedral designed on primitive lines, rather than a mere reproduction of a Mediæval church." We have already urged the same course, both in regard to the architectural surroundings of the site, and the religious feeling and spirit of the present day, which a Mediæval cathedral does not represent. Two things in Mr. Fergusson's article puzzle us; first, why he should depreciate, as he does, Wren's earlier design for St. Paul's (that of the model) which Wren preferred, and which we certainly think a finer design than the executed one; secondly, why he should go out of his way to bring in the west front of St. Alban's, and why he should appear so completely unconscious of its exceedingly bad detail. In spirit, we agree, it is the sort of thing that modern architecture should do; in detail it is, in many respects, coarse and vulgar in the extreme, and, bad as it is, there is no proof that the person who claims the credit of it can "design," or ever has "designed," anything at all, or done anything else but pay the money and boast of his achievements. If Mr. Fergusson can appreciate the excellent Gothic detail of the Law Courts,—which, nevertheless, we agree with him in thinking a failure as a whole,—surely he might have been expected equally to appreciate the exceedingly bad Gothic detail of the St. Alban's front.

IN the annual address at the Royal Society on Monday last, Mr. John Evans, who presided in the absence of Professor Huxley (who has gone abroad for his health), touched on the subject of metric weights and measures, recognising the value of the metric system scientifically, but intimating that the superior practical usefulness of the duodecimal system for everyday use was still a matter for argument. On the vexed question of a prime meridian, he suggested that France might meet the case by selecting some place on the same meridian as Greenwich—such as Argentan—as her nominal starting-point. The French objection to accept Greenwich, merely because it is an English town, is one of the most foolish pieces of national *amour-propre* on record. The chairman also referred to the proposal, at the Geodetic Congress at Rome last year, for a universal solar day of twenty-four hours, but expressed no opinion. The idea will furnish *Punch* with a few jokes for a time, and will probably in the end be quietly adopted.

WE learn from the *Gazette des Architectes* that the "Société des Amis des Monuments Parisiens" has resolved to demand from the Government a law visiting with decisive punishment the injury to, or "dégradation" of, works of art,—a kind of law which, we venture to think, they will find it more easy to talk about than to formulate in any practical manner. A committee of the Society has collected the remains of the former sculpture of the Pantheon and Ste. Geneviève, and another committee has been named to carry out a classification of works of art,—a very useful piece of work, which, we should say also would be a necessary preliminary to the talked-of legislation. The Society has recognised the necessity of asking the authorities for a sum of 50,000 fr. to prevent the destruction of the Porte St. Denis. Altogether, the society (of which M. Chas. Normand, 215, Boulevard St. Germain, is the hon. secretary) seems to be commencing its career in an energetic manner. We only hope it will not—like our analogous society—lose its head, and run into extremes.

THE Cambridge University Town and County Fine Art Association held its opening meeting on Saturday evening last, in the new Studios, St. Andrew's-street, Cambridge. Dr. Waldstein afterwards presided at a meeting in the adjacent Theatre Royal, at which Mr. Seymour Haden and Mr. Sparkes were present and made some remarks. We quite concur with the latter gentleman in his three great principles in the study of art, viz., to draw, and to draw, and to draw. It is a pity Mr. Seymour Haden should have committed himself to the statement that it was "a notorious fact in the profession that surgeons who could draw were the best operators." Some of the greatest surgeons of the day cannot draw a stroke, and no good purpose is served by making *ad captandum* statements of that kind.

A CORRESPONDENT writes:—"The care which is sometimes taken to recover facts about the dead who have died long ago is out of proportion to that which we take to preserve a record of the lately dead. On the 19th of last October there passed away, after some months of great suffering, an architect whose talents would have entitled him to a far more prominent place in his profession if he had thought the prize worthy of the struggle which must nowadays precede success, and who excited the most sincere respect in all who had dealings with him. Mr. Major Rhode Hawkins was the son of Mr. Edward Hawkins, sometime Keeper of Antiquities at the British Museum, and a prominent figure in literary and artistic circles of his day, and was born in 1821. He was educated at the Charterhouse, and passed thence first to the great building establishment of Mr. Cubitt, where he grounded himself in practical knowledge, and afterwards to the office of Mr. Blore. He then accom-

panied Sir Charles Fellowes to the East, and, returning to England, commenced the practice of his profession as an architect. Amongst his works the Royal Patriotic Asylum at Wandsworth Common, the Church of St. Michael and All Angels in Praed-street, a church at Exeter, St. James's Church, Vicarage, and Schools at Birtswith, Yorkshire, and numerous smaller churches, schools, and parsonage-houses attest his constructive skill and artistic taste. For thirty-one years he was the professional adviser of the Committee of Council on Education. He was an assiduous collector of beautiful things, and the Surrey home in which he died was a very storehouse of examples of precious art selected with rare knowledge and discrimination. The writer knew him well, and only records the general sentiment in saying that he was both a skilful artist and a thorough English gentleman."

ONE of the most dangerous places in London is the junction of Northumberland Avenue with the Thames Embankment. During the daytime it is bad enough when cabs and carts fly over the wide crossing in all directions. We ourselves have seen one horse killed in a collision on this spot. But after dark the danger to foot-passengers and vehicles is further increased. All this arises from the want of a proper "refuge" in the centre of the roadway. This would not only be a place of safety for foot-passengers, but would regulate the vehicular traffic, and the Board of Works should place such a refuge in this thoroughfare without delay.

IT appears that a few days since there arrived, by the P. & O. steamer *Brindisi*, the first detachment of native Japanese who are to colonise a Japanese native village, to be opened shortly at Albert Gate. The affair seems to us to be a foolish one. Show villages got up in that way rarely show the real life or manners of a people, and the only effect will be probably to get up another little and local Japanese craze, just as the big one is dying out, and most people are beginning to come a little more to their senses on the subject. The Japanese, it appears, are now doing all they can to imitate English customs and dress, while people here will probably get the mania for imitating things Japanese,—a foolish paradox on both sides.

A LETTER in the *Times* of Thursday, signed "X.," in relation to the decoration of the cupola of St. Paul's, takes the line that all the propositions made have been deemed undesirable, and that it will be "no matter for surprise if the Committee should, for a solution of their difficulties, and a satisfactory discharge of the semi-public duties confided to them, turn to the original plan of coffering the cupola of St. Paul's in accordance with the recorded mature experience of the architect of St. Paul's Cathedral." Concerning which we need only remark that, in the first place, to obliterate Thornhill's work, which has a certain artistic value, for the purpose of replacing coffers, which are a mere semi-mechanical expedient for breaking up a surface, would be a retrograde step little short of contemptible; secondly, that "the trace of Wren's pristine ideas now to be seen in the coffering above Thornhill's gloomy paintings" is a delusion, inasmuch as these coffers are not real, but only painted imitations.

THE collection of Venetian drawings by F. N. Roussoff, now on view at the rooms of the Fine Art Society, should by no means be missed. Though M. Roussoff shows himself a good figure-painter, the majority of the paintings are mainly architectural in their subject and interest; and they exhibit a union of breadth and force of style with architectural truthfulness, such as is not often met with.

MR. WATTS'S grand but rather inexplicable painting, "Time, Death, and Judgment," has been reproduced in mosaic on the outside of the tower of St. Jude's Church, Whitechapel, forming an important incident in Mr. Barnett's admirable efforts to bring art home to the East-end population. We should have thought a painting more simple in its idea would have been better suited to the occasion; and, for mosaic to be effective, it should have been further from the eye. With tesseræ of the usual size it is impossible to model a face properly to be seen at only a few feet from the eye. The work was unveiled on Saturday last, when Mr. Matthew Arnold gave a very beautiful address in relation to it in the adjoining schoolroom.

THE COUNTRY BUILDER.

HE lives on the verge of a breezy common, bright with golden gorse. A shallow river of clear water courses swiftly by over its gravelly bed, and is seen in flashes of light between the trees whose drooping boughs frame the squat church-tower, and half obscure the sacred structure with their lace-like veil of now almost leafless branches. His house stands a little back from the skirting road, and the intervening "waste" is littered with the fantastic trunks of fallen elms,—monarchs of the forest and hedge-row. Originally a simple weather-boarded cottage, his dwelling has expanded with the increasing family and fortune of its owner, and now forms a long irregular line of straggling structures, partly in wood, partly in ruddy brickwork, and partly in the bravery of freestone, "credits" from a neighbouring mansion, which he remodelled some years ago. The office, stable, and workshops continue the series, the latter gay with dabs and smears of bright colour with which the painters have experimentally adorned their sides, and which have a value in the general effect never contemplated by those artists. The yard is a medley of stone, brick, drain-pipes, tiles, crestings, and old lead. In the midst stands a sun-dial on a stone baluster-pedestal,—a perpetual reminder of the fleeting character of man and his works. The yard dies away imperceptibly into the orchard beyond where the saw-pits are, and where the children have established their swings and see-saws, partly for the comparative quiet and security of so remote a portion of the establishment, and for other reasons. There are apples on the trees, and blackberries in the enclosing hedges, and the railway runs along the further corner, and affords the youngsters opportunities for that shouting and waving of kerchiefs in which all country children delight. The office is a tight little apartment, 7 ft. by 6 ft., and by some artful adjustment and much mutual forbearance, it accommodates the jolly builder and his slim clerk. It has the smallest fireplace in the world, and one of the most primitive construction. The furniture is necessarily sparse, and intentionally far from sumptuous. A couple of wooden stools, home-made, very high, and uncompromisingly hard. Two deal desks, also home-made; a penny bottle of blue ink, and one ditto of red; some scraps of dusty blotting-paper, quite obsolete; memorandum-books and ledgers, some showy trade-cards, and a perfect forest of plethoric "files." Everything which is not bundled unceremoniously into the desk is impaled upon a "file," and hooked up to a nail in the rafters, whence the files depend like some new form of stalactite. The worthy builder is a manly man, of noble presence and proportions, so noble, indeed, that he has to sidle through his office-door to greet you. He was selected to serve on a local committee, on the ground that he complied expressly with the qualification, "a substantial householder." He probably weighs some seventeen stone, when "disarrayed as to his rest." What he may weigh as he stands is not to be conjectured. As he steps into that light spring-cart his horse steadies himself resolutely, spreading out his fore-legs as buttresses against the thrust of the deflecting shafts, and shows a sensible relief when the seat is safely reached and the general balance restored. Our friend's great coats are voluminous, vast, and weather-defying. One favourite garment would, he boasts, turn a week's rain. The pocket-books which he stows away in the recesses of his costume are big and bulky beyond all belief. It costs him a struggle to fish them up from their hiding-places deep down in his capacious pockets, and when caught and landed, with much accelerated breathing and redness of face, the wrong one generally comes first. His honest, wholesome face is brimming over with good health and good spirits. Nature has carefully passed over it a flat tint of her choicest "rudde," and the rich colour is preserved by draughts of home-brewed and daily drives in the brisk country air. His jovial countenance is set in a stiff frill of bristly brown hair. He shaves a square inch or so in the immediate region of his mouth, and lets the rest take its course. He has a pair of piercing brown eyes, full of bright intelligence, and not without a suspicion of a latent humour. At the penny readings over which the vicar presides, he will recite pieces of a sentimental and even savage cast, but on club nights, or the annual bean-feast, no one can sing a rollicking country song better than he. His humorous anecdotes would be effective but for their extreme antiquity. After some years they are received with impatience by his hearers, but they never fail to throw the good man himself into fits of laughter. He is a man of property, owning casual patches of land here and there,—to which he is continually adding,—and not a few of the cottages in his neighbourhood, building them in slack times rather than discharge his old hands. His men have an unbounded admiration for him,—a chance remark on his great depth of chest elicited the startling rejoinder that "It is not only in the *chest* as master's deep. He's pretty deep every way, sir, he is!" And by depth the speaker meant not cunning, and not guile, but wisdom. If a man cannot be a hero to his valet it is certain that he can be one to his foreman of bricklayers, which is just as good or better. During working hours and about his work he is reserved and even stern, as becomes a man of his occupation. His children meeting him in the yard fly before him like the fowls, and even the partner of his joys ventures upon no familiarities in business hours, but devotes herself silently to the house affairs. He is known in every town and village for twenty miles round, and respected wherever he is known. It has been his interest to cultivate the acquaintance of the agents, stewards, butlers, and housekeepers of all the great houses within his radius, and he has contrived to conciliate them all. The county gentry meeting him driving through the green lanes of Dampshire tilt the ends of their whips, and nod in passing. The slowness and deliberation with which he will, when on his rounds, conduct a conversation about nothing with the innkeeper or the blacksmith must be witnessed to be believed. If you want to know where the best ale is to be had in Dampshire and the neighbouring counties you may consult a less trustworthy authority than he. Needless to say that he is the soul of hospitality, and in more than one sense a cheerful giver. Once upon a time, calling by arrangement at his house we found him not,—haled thence by a summons he could not deny. A note awaited us, full of confused but sincere apologies for his enforced temporary absence. We were shown into the "parlour," where this embarrassing array of good things had been extemporised for our behoof, viz., about 2 lb. of biscuits; one bottle of port, freshly decanted; one ditto of sherry, ditto; one jug of foaming ale (strong, no doubt, and old); one bottle of whiskey; a plate of apples; one of oranges; one of nuts; a box of figs; a box of cigars,—quite new; one ditto of cigarettes,—ditto; a half-pound packet of tobacco (some used), and, prettily tipped with sealing-wax, a long, long pipe of the virgin clay. With trifles such as these, he thought, good soul! that one might beguile a brief half-hour. Nor was there the least suspicion of satire in this amazing preparation for the casual refection of a poor dyspeptic Cockney. The alternatives were offered with the instincts of a true gentleman, and we have never ceased to reproach ourselves for our want of breeding in leaving the whole untouched.

The good man is not without his weaknesses, but they are neither discreditable nor mean. He prides himself upon an accurate and minute acquaintance with London and its ways. He has been at much pains to inform himself of the geography of the less known portions of the great city, and the recondite character of his knowledge of out-of-the-way localities gives him a great importance in the eyes of the local butchers and grocers who confine their travels to Oxford-street, the Strand, or Cheapside, never in their annual visits deviating further than the Agricultural Hall on the one side or Kennington Oval on the other. These he looks upon as "home-keeping youths," and receives their

attempts to interest him in London and its doings with a supercilious smile which means that he should like them to tell *him* anything on that subject which he is not already "up to."

Another of his weaknesses is connected with his business. He has retained a special liking for the descent of wells, and will in this department admit no rival, looking upon young aspirants (wanted, a word of equivalent force with a minus sign) as upstarts (or ? downstarts) and nincompoops. He knows the depth, capacity, and idiosyncrasies of every well for twenty miles round, and many are the strange stories he can tell of the perils of those who go down into the earth in buckets and do business in deep waters. It is a fearful thing to watch him descend, candle in hat, down, down, down, until the light dwindles to a scarcely distinguishable spark, and the wearer is lost in gloom. A discreet helper accompanies him in all these expeditions who may be depended on to understand and obey the signals of his master. They go about their work silently, with set faces, as though they were engaged in some wicked trade, with consciences burdened by the accumulation of untold crimes. But there is a fascination to both of them in the risks run, and they court rather than shrink from fresh opportunities for their solitary enjoyment. Strange things are brought up in these excursions, — things which we cannot here describe. Not truth only,—or not only in the accepted sense,—lies hidden in wells, and when next the *Daily Telegraph* young man is in want of a basis of truth for his imaginative flights he cannot do better than spend an hour with our friend and "draw" him on the subject of wells.

Adieu, honest friend! We have known and loved thee from our youth up! "Such men as thou art England's pride," and long may your race be spared before it makes way for the inevitable mercantile gentleman with his machinery and "improvements" and new-fangled ways. We had rather explore thy rugged and picturesque "yard" than the most scientifically-arranged "contractor's" establishment, and the peace and quiet of your uneventful home-life has for some of us more attractiveness than all the joys that South Kensington itself can offer.

THE APHRODITE OF CNIDUS.

The attempt to reconstruct in imagination the masterpieces of Greek antiquity from the dim distorted shadows preserved for us in Græco-Roman copies is heartbreaking work, and yet, however certain and painful the failure, so potent is the fascination that we cannot withdraw our hand. Praxiteles made a statue of Aphrodite which the goddess came over the waves from Paphos to see, and, seeing, approved, —a statue which the Cnidians themselves refused to sell for the payment of their city's debts. The marble image perished, but the memory of the statue of the goddess in her matchless, unveiled beauty has haunted men's minds, and goaded them to hunt through the museums of Europe for some echo, however faint, in statue, coin, or gem, of this masterpiece of Praxiteles. What they have found is briefly this: five statues, three belonging to the Vatican, one in the collection at Lowther Castle, one in the Glyptothek at Munich, all of them reproducing the same motive, Aphrodite standing near a water-jar, on which she lets fall from her left hand the drapery she has just cast off. She is about to enter or leave the bath, or possibly, as some have poetically suggested, the sea from which she rose. Add to these five statues three coins struck at Cnidos under Caracalla, the design of which is indubitably copied, however roughly, from the famous statue. Of the five statues the two best known, and on the whole, we think, the nearest to the original, are the Munich statue and the Vatican replica distinguished as Museo Pio Clementino, No. 574. We are glad that casts of these two have been chosen to represent the goddess in the new Cast Museum of the South Kensington Museum, not because we consider that the two statues are by any means of equal merit, but because their juxtaposition as replicas of the same original suggests certain reflections. We hold that the Vatican Aphrodite (in the catalogue No. 115) is far the finer of the two, and that the Munich copy represents a downward step in the degradation,—only too speedy,—of the Praxiteles Aphrodite type. Briefly for these reasons. First, the Vatican Aphrodite is distinctly *letting fall* her drapery; it is just about to escape from her hand, the folds of the stuff all witness to the downward motion; there is no dragging, upward tension. This is further witnessed to by the distance between the figure of the goddess and the water-jar; she has evidently not advanced to pick up her robe, but turned away, and is dropping it negligently as she goes. All the intention of her posture is away, not towards, the drapery. Now, in the Munich copy, No. 116, the goddess is close up to the water-jar, and we should incline to say she was, or, at least, might be, *catching up* her drapery. One sees at once what a gulf there is between the two thoughts. In the one, Aphrodite is a goddess, who in her fearless innocence casts aside her robe and simply and unconsciously unveils her peerless beauty; in the other, she is a timid Susannah catching up a garment to screen herself from the eyes of peering Elders. The authorities of the South Kensington Museum are to be congratulated for their good fortune in possessing a cast of the Vatican statue in its original simplicity, no longer disfigured and degraded by the stucco drapery imposed by the mock modesty of a prudish Pope. A second point of superiority we claim for the Vatican goddess: she is looking *down* quite simply and unconcernedly in entire unconsciousness; the Munich Aphrodite is looking *about* her, as if on the alert for a possible spectator. Of course, in deciding the question which statue is nearest to the original of Praxiteles, we naturally claim the higher conception as his,—a copyist frequently degrades, rarely, if ever, improves. We naturally, also, refer to the Cnidos coin. We find the distance between the goddess and the hydria accords with the Vatican statue. Of the direction of the eyes we can scarcely judge, as the face is turned profile-wise, after the usual custom of of coin art.

We think, then, that in the Vatican statue we have the highest nude Aphrodite ideal, and that nearest to Praxiteles. We cannot enter here into the question whether by thus representing the goddess entirely undraped, Praxiteles degraded the conception of the goddess altogether, and showed himself a near precursor of the downfall of art. Our own conviction is, that he did. There is about beauty undraped a certain sense as of a thing overdone,—a charm overstated, a last word said which vexes even sensuous enjoyment if it be refined,—we long for a little reserve, a little holding of the hand. M. François Lenormant makes the ingenious suggestion that the worship of the nude Aphrodite came in with the worship of the nude Anaitis, which was revived under Persian rule by a decree issued about the time of Praxiteles. We would gladly find any excuse for what seems slight reverence to an awful goddess. Be that as it may, we may safely welcome the Vatican Aphrodite and even the Munich goddess; for, though conscious, she is still delicate and refined. Surely these examples of the type might have sufficed. In a museum where space is very precious, and where, if our object were general criticism, we could note some glaring omissions, why is place to be found for a statue so utterly vulgar as the Venus de Medici? Winckelmann, who desired so earnestly to see the day that we see, and did not see it, has called this statue "a rose which bursts at sunrise after a beautiful dawn," but had he ever been allowed to see for one moment any fragment of the Pheidian age, how swiftly would he have unsaid his words. It is too much that a nation that possesses the maidens of the Parthenon frieze should be taught, in the words of the South Kensington catalogue, that this self-conscious, prudish, suggestive statue is "the embodiment of the highest ideal of a lovely woman in the early springtide of her beauty, arrayed in all the external attractions which can charm the senses and fascinate the heart . . . . it appeals at once to the senses and the hearts of all." If this Venus were considered too prominent an example among the known works of antiquity to be omitted, at least she need not have been thus disproportionately and unsuitably extolled.

Building in Toronto.—The Canadian correspondent of the *Liverpool Journal of Commerce* says that Toronto in building operations is getting ahead. Last year the total value of buildings erected was about 1,500,000 dols., but this year the amount is over 2,000,000 dols., exclusive of St. Mark's and St. Matthew's wards, annexed this year.

THE SOCIETY OF PAINTERS IN WATER COLOURS.

For once we do not feel quite inclined to join in the enthusiastic verdict which this exhibition usually tempts people into, that this is one of the best exhibitions they have ever had. It is not so good as some; it is a little quiet. Mr. Hunt exhibits nothing,—a great gap in itself. The loss of Mrs. Angell's exquisite work seems more felt every time the exhibition comes round. Mr. Tadema is not represented, and Mrs. Allingham is not at her best. We cannot get over these facts; but there is a great deal to be seen.

In the absence of Mr. Hunt, there is no doubt that Mr. A. Goodwin takes the highest place as an original water-colour artist; one who has risen above manner and escaped from the clogs of paintiness. "The River at Rest, Stratford-on-Avon" (90), is an exquisite piece of landscape steeped in warm, misty sunlight, and looking rather like a vision than a material work of the brush. Other works by the same artist show the variety of his powers; also, perhaps, a tendency to idealise nature a little too much, in scenes which do not profess to be those of faërie-land. Mr. North is another idealiser, but with only one way of doing it, though that is a very beautiful way; still, the first question one asks before his "English Water-mill" (30) is, Can that be called "English" in any sense? Among landscapes of the more sober and real type, yet broad in handling, those of Mr. T. J. Watson stand out pre-eminent, especially "An Autumn Landscape, Surrey" (270). A very fine work of a more idealised class is Mr. Tom Lloyd's "Through the Barley Field" (220), an evening landscape finished down to the most delicate demi-tint effect, with two small children coming between the barley in the middle of the foreground. This is a very taking picture, but produces on one rather the same feeling as over-papered and polished up carving; in seeking after high finish and delicacy, force has been lost. There is plenty of the latter quality in Mr. Lockhart's "Auld Kirk of St. Monance" (51), where the old building is a solid heavy brown mass against the very distant and aërial sky; the broad manner in this and other works by the same artist, which leaves washes nearly untouched in texture and trusts to truth of tone for definition, is noticeable. Mr. H. M. Marshall continues his admirable views of London streets and localities; a very good one of Whitehall is seen in the present exhibition, besides a number of other drawings, among which "The Fish Pier, North Shields" (27), is, perhaps, the best. Mr. Thorne Waite sends a considerable number of small studies, he being one of the few who keep to the original idea of the Winter Exhibition as a "sketch and study" exhibition. The Princess Louise sends a very good drawing of the "Schloss Heidelberg" (97), a well-known Turner subject taken from the same point of view as Turner's drawing, and also a pencil sketch portrait of the Princess Victoria of Wales (142). Mr. Wilmot Pilsbury's works present the same admirable qualities and the same limitations which we have before noticed. Among other good landscapes are those by Mr. Brierley, Mr. Eyre Walker, Mr. Naftel (especially 251); some architectural sketches in Rome by Mr. H. P. Riviere, and a subject by Mr. G. H. Andrews, "The Temples of Selinuntum, Sicily" (258), exhibiting chiefly the huge drums of fluted columns lying about on the ground, which is of some interest to architects, and is a good work in itself. Mr. Wallis's "The Bishop's Tomb" (31) is another good architectural bit. Miss Mary Forster, the new Associate, has some beautiful drawings in true water-colour style, especially "Pembroke Castle" (286).

Among the figure subjects, the most pathetic is Mr. A. H. Marsh's "When Work is O'er" (57), which has a little of the inspiration of Mason in it, and, like Mason, shows us rather idealised rustics; but it is a fine thing, good to look at. Equally good in the most opposite way is Mr. Arthur Hopkins's "The Result of the Races" (209), a crowd of betting men, grooms, and other varieties of horsey persons listening to the announcement by a coarse and forbidding person under a portico. There is character in every figure. Mrs. Allingham's best is the "Apple-tree Seat" (118). Two figures by Mr. J. D. Watson, "The Sliding Panel" (127), where a bravo, with sword drawn, is entering, and "Ash Wednesday" (168), a figure bowed over a chair in grief, are both exceedingly ex-

pressive in their way. Sir John Gilbert's "A Retreat" (172) is spirited, but like many other things he has done. Mr. Parker sends a pretty figure under the title "Scraps" (197); Mr. Poynter, some studies of heads (305, 310); Mr. Marks, two figures, entitled "An Argument" (324), oddly divided in the mounting, though they belong to the same subject; Mr. Walter Duncan, a couple of studies of foliage; and M. Du Maurier, two coloured drawings, which make us wish he would restrict himself to Black and White.

THE INSTITUTE OF PAINTERS IN OIL-COLOURS.

THIS exhibition, which is "like Cerberus, two gentlemen at once," for it is the "Institute of Water-Colour Painters" in summer and the "Institute of Oil Painters" in winter, opened as usual on the same day as the Society of Painters in Water-Colours, Monday last to wit. There are some pictures of great merit, with a fairly good average, but including a good many works of very little interest. The wall space is too large, in proportion to the objects and scope of the exhibition, to leave any chance of filling it worthily.

As in the case of the Society, some strong names are wanting or little represented. Mr. Abbey contributes nothing; Mr. Collier only two small drawings looking a good deal like replicas of former ones; Mr. Linton only a single figure, "The Knight" (352). Among the more important works, perhaps the very finest is Mr. Arthur Severn's sea-coast scene, "A Gleam of Sunshine after Rain" (145). Heavy clouds float over the sea, just rendered lurid rather than bright by a touch of red light from a low sun; the sea, with its wave faces all turned away from the light, still retains the cold brown gleam of sea under a rainy sky. The attempt is bold, but successful, and the painting is full of poetic feeling. After this perhaps the works which are likely to attract most notice are Mr. H. J. Stock's imaginative or allegorical subjects, "He giveth His Beloved Sleep" (46) and "Two Lovers meeting after Death" (139). In the former a nude angel, not specially suggesting the idea of sleep, but fine in attitude, kneels beside a sleeping figure; in the latter two figures rush to embrace each other in a landscape which is purposely kept rather vague in its incidents. The colour of the first-named work is fine. In the two lovers the expression of the female, who has evidently been the first to enter into everlasting life, is very beautiful; she floats in the air and stretches out her arms with a calm and tender welcome; the other figure, still treading the ground, rushes towards her in rapture. Both works belong to that type of painted allegory which is dangerous ground, and in which some may perceive a certain ludicrous element; yet, with all the prosaic materialism around us in the painting of the day, we cannot but sympathise with an artist who aims at least at speaking to the heart and to the imagination. To aim high is to strike high; and Mr. Stock may end in accomplishing higher things yet. Mr. John Parker sends a life-size head of a young woman, entitled "Study" (12), which is painted with much power. Among figure groups Mr. Joseph Clark's "An Appreciative Audience" (504) is in his best way as a study of "cottage life," and has the merit (not uncommon in his work, though) of being singularly well composed without obtruding "composition" on the spectator. Mr. Seymour Lucas has a large work under the title "Eloped" (517), not quite in his best vein, but among the leading pictures of the collection. To say truth, we have not, after all, been able to note much that gave one the higher kind of satisfaction that painting at its best affords. Among things that have a certain point and speciality we noted "A Woman of the Fields" (22), by Mr. G. Clausen; "Amateurs" (71), an "impressionist" work by Mr. E. Stott; "Salome" (84), by Mr. Melton Fisher; "St. Kilda" (222), by Mr. MacWhirter; "Portrait of A. J. Lloyd, Esq." (447), by Mr. Shannon; "Anticipation" (460), a capital study of cats and "still life," by Mr. G. E. Waller; "Afternoon, Early October" (465), by Mr. Mark Fisher (only, begging Mr. Fisher's pardon, his tone for "early October" is precisely the same as in the works he calls "Early Spring"); "Here lies Captain Nicholas Comfrey, Master Mariner, Rotherhithe, 1678" (525), a study of a delightful old tombstone with scrolls at the angles, by Mr. F. Murray; "Study of a Lion's Head" (641), by Mr. Heywood Hardy; "Sea Urchins" (669), by Mr. Wetherbee; and "De Gustibus" (698), by Mr. Dendy Sadler, a capital painting both in execution and character. In the interests of architecture we may note that Mr. P. Morris sends "A Wedding at St. George's" (766), in which the columns of the portico are only five-and-a-half diameters high. Odd that the eye sees only what it is trained to see. To an architect the column looks ridiculous at once, and yet here is a painter who has probably made a study from it on the spot, who deliberately paints it all out of proportion. He would never make a human figure so out of proportion, and a column is ever so much easier to draw; but he has not been in the habit of noticing its proportions. So we are made.

THE INTERNAL ARCHITECTURAL TREATMENT OF CUPOLAS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the third ordinary meeting of the Institute, on Monday last, Mr. Ewan Christian, president, in the chair, the discussion on Mr. Stannus's paper on "The Internal Architectural Treatment of Cupolas"* was resumed.

Letters were read from Mr. Edmund Woodthorpe and Mr. J. G. Crace regretting their inability to be present. The latter thought that the decoration of St. Paul's should be strictly in accordance with its simple dignity, and any exuberance of subjects would be out of place. He agreed with Mr. Armitage that there should be a grand design, clearly defined, and almost flat, with slight shadows.

Mr. George Aitchison, A.R.A., said it was hardly necessary to repeat the thanks which had been already given to Mr. Stannus for his exhaustive treatise, which was one of the most valuable ever submitted to the Institute. As regards the proposed decoration of the dome of St. Paul's, he could only say that nothing would, in his opinion, be so disastrous as the postponement of the work. Our public buildings were crying in vain for completion by sculpture and painting, and if the work be now indefinitely postponed until the best of all possible designs can be got, a blow will be given to decoration from which it may never recover. Who can say that we should not become involved in a great war, and the adornment of our public buildings be postponed for a century, or perhaps for ever? Whatever might be said of the late Alfred Stevens's design, it was undoubtedly that of a man of genius. Owing to objections of the Committee to portions of this design, Mr. Poynter was asked to make certain modifications of it, and this modified design was now to be seen *in situ*. Sir Frederick Leighton undertook, as a tribute to Stevens's memory, to make the cartoons for the larger circles at such a cost as would involve him in heavy pecuniary loss for a series of years; but this sacrifice could not be well asked for if some other design were substituted for Stevens's. When the country was able to secure the services of such eminent men for a nominal sum, it appeared to him to be the very height of madness to reject the offer. But some wiseacres said that our buildings should not be decorated until we could secure the services of an English Titian, and this reminded one of the Greek who swore he would never go into the water until he learned to swim. The triumphs of Titian, Tintoretto, Paul Veronese, Correggio, Raffaelle, and Michelangelo were due to the antecedent century, when decoration was applied to every public building. By this means a school was formed, from which these transcendent geniuses were evolved, and we should be putting a stop to further excellence in mural decoration if we neglected the work of the greatest extinct genius this century had produced in England, carried out as proposed by two of the ablest painters of the day. If Stevens's design was to be rejected, and a fresh one made, in common courtesy Mr. Poynter and Sir Frederick Leighton should be first asked to give their views of what was appropriate, and the committee must be prepared to pay the current price for that design, and the subsequent cartoons.

Mr. Frampton contended that if panels were used they should be egg-shaped. The pictorial work of the dome might be in fresco. A gold back-ground, with either light or dark figures, would not produce an aërial effect. Gold was terribly opaque; it contracted the appearance of vastness, and as the glittering enemy of all solemnity, was unsuitable as a means for decorating the ceiling or dome of a grand cathedral. It might be used with effect in secular buildings where a gorgeous result only was desired. The dome of St. Paul's should be an ideal of the great azure canopy formed over this wondrous world, with a blue background representing the heavens, and the figures should be draped in whitish raiment, placed in spiral groups, and of majestic size. A magic lantern might be used for throwing the designs on the dome, and determining which was most suitable. He hoped the decoration would be carried out in accord with the sacred character of the building.

Mr. Emerson referred to what Mr. Stannus had said as to the necessity for the articulation of the dome with the subjacent architectural features. An attempt to carry out this proposition might lead to difficulties. Out of twenty-six of the most important domes, in only three did the internal decoration articulate with the subjacent parts, and in each of these cases the lines were carried down to the ground. Out of the twenty-six examples only four articulated with the axis of the architectural features under the vault, and in all the rest there was no suggestion of articulation with the subjacent parts. A subdivision of the surface into ribs seemed to hint at some constructive feature behind, which was a suggestion of false domical construction.

Mr. Edward Armitage, R.A., referred to the design by Mr. Wild which had appeared in the *Builder* (see p. 689, *ante*), and which, as a painter, he preferred to those which were cut up either by vertical ribs or circular panels. In Mr. Wild's design the painter had fair play; his groups and figures, whether good or bad, would at any rate be seen, and not smothered, as Mr. Poynter's were, by very questionable painted architectural details. No one blamed Mr. Poynter or Sir Frederick Leighton for this; the only regret was that so much good work should be thrown away where it could not be seen. The better the work, the greater would be the regret if this unfortunate arrangement of Stevens's should be adopted. He was not in favour of a revival of Gothic or Romanesque stiffness in the figures, but considered that the personages depicted in a Christian cathedral should be simple, calm, and dignified. This could only be attained by allowing the artist plenty of space to develope his groups. Where this was not allowed, he was forced to give unnatural attitudes to get them into the small panels allotted to them. In Mr. Wild's design he found four unbroken segmental spaces, each about 60 ft. long by 24 ft. perpendicular height, and this was a magnificent field for a painter. The figures he (Mr. Armitage) had sketched in were probably too upright, but he had exaggerated their perpendicular form to show the general nature of the composition, which might be termed a sort of zonal treatment. These figures would be found 13 ft. to 14 ft. high, and would be sufficiently large to be seen from below. When grouped in masses the angles at the top of the cupola would radiate from the centre and be about 11 ft. high. These arrangements might have to be considerably modified if the subjects were different, but he felt strongly that if figures were to be introduced at all into the dome there should be ample space left for their free development. It might happen that some day the dome might be brilliantly lighted by electricity, but even then the figures would be much better seen from below if grouped in large masses and not mixed up with painted architectural ribs and panels. He had no objection to ribs in a dome if treated architecturally. What he did deplore was their union with figures. The painted architecture chilled the figures, and the figures injured the architectural decoration. In spite of the authority of Michelangelo there seemed to be a want of reverence in making angels and apostles do duty as caryatides in building up the architectural features. Before the decoration of the dome was settled he hoped the incubus of Stevens's design would have ceased to overawe the minds of those who had to deal with it. He was convinced that any arrangement founded upon it would prove impracticable and unjust to those who might be commissioned to carry it out.

* See p. 687, *ante*.

Mr. Ralph Neville thought it was rather late in the day to pick holes in other people's designs, when they had come to discuss the question of the decoration of cupolas generally. The gold mosaic was always the valuable part in decoration wherever it was used, and anything put on it should be looked upon as a framework and ornament to it. No figures showed against the strong light of the gold mosaic, and it was the one thing which struck the eye. In all the earlier examples this was very much attended to, and little colour put upon it. One fine example was the beautiful little Church of St. Praxed, which Mr. Statham had referred to on the last occasion. No figure subjects would show up in the dome of St. Paul's under ordinary circumstances, and even gold mosaic would only show where the light caught it. The earlier examples showed that little colour should be used on gold mosaic. The rib treatment seemed to be a false treatment, and the only reason for introducing it was that as it was a serious thing to make a design for a whole dome, it was easier to divide it by ribs and treat each section separately.

Mr. Woodward could not understand how a man possessed of so much information as Mr. Stannus was could have connected himself with the two cartoons now hanging in St. Paul's. Three points had been enforced, viz., scale, originality, and articulation. It only required a moment's study of the designs now exhibited in the dome to see that they were utterly destructive to scale, not only bringing down the dome, but also destroying its glorious concavity.

Mr. F. C. Penrose, in reference to a remark of Mr. Woodward's, said that Mr. Poynter had nothing to do with the design on the podium.

Mr. Woodward contended that the ornament on the podium was of a vulgar character. In regard to the treatment of the upper portion, the circles were quite destructive of articulation, and discorded with the architecture. He had gone up to the Whispering Gallery, and even there it was impossible to distinguish what the figures were. They did not want pictures. Give the dome three coats of paint, and then distemper. [This seems to have been meant for a joke,—and a very poor one.]

Mr. G. A. Audsley could realise nothing in the conditions of the dome to call for the articulation of its design with the subjacent architecture. When they had got strong corner lines over the peristyle they had surely done with the substructure. If the divisions were vertical and few in number a grand design was impossible, and all mystery as regards form and dimension would be done away with. The details consistent with eight divisions again would produce a dwarfed effect, and the introduction of a few colossal figures would also help in this direction. The proper scale for the figures became a work of the greatest importance, and one worthy of exhaustive study and experiment. He would lay down the following propositions as to the decoration of the dome:—(*a*) That the internal surface of a dome, circular in plan, must not have a vertically divided treatment; (*b*) that the surface of a circular dome, being uniform and unbroken, must not have any decoration calculated to impart a different character to it; (*c*) that if the surface of the circular dome must be divided by its decoration, it must be in the horizontal or zonal manner; (*d*) that the zonal treatment must not be of so pronounced a character as to call special attention to the lines of division; (*e*) that subject decoration must admit of the introduction of a great number of details of moderate size, so that the dome may be increased in appearance to the eye of the observer; (*f*) that the subject must form one grand composition rather than be disconnected and isolated in its constituent parts; (*g*) that the subject must be one which, transferred to the domical surface, will not strain the eye of the observer, or strike it with a feeling of absurdity; and (lastly) that the subject should be one in which a certain mysterious and supernatural character prevails, and which should call forth the highest powers of imagination. The subject which presented itself with most force to his mind, as full of the most solemn mystery and grandeur, would be the glory in heaven immediately following the Last Judgment. Mr. Audsley read a description of his proposed scheme, arranging the figures according to the Mediæval idea of the divisions of the heavenly hierarchy into Cherubim, Seraphim, Thrones, &c.

Mr. Blagrove considered the coffer treatment was not only appropriate, but that intended by Sir Christopher Wren. He objected to any paintings of a Mediæval character such as had just been described, and thought the subjects chosen should be in accordance with modern feeling and modern belief.*

Mr. J. Douglass Mathews thought that the dome should be treated as a vault. The hemispherical form suggested the firmament, and it should be cut up into three horizontal divisions, indicating earth, sky, and heavens. A first-class fresco-painter would be more suited for the work than a painter like Sir Frederick Leighton or Mr. Poynter.

Mr. William White, F.S.A., believed that the picture of the Heavenly Jerusalem was the proper representation for such a dome. With reference to the employment of blue and gold, blue for distance was calculated to enlarge the scale, and anything in the shape of yellow or gold brought the distance nearer and lessened the scale. In such a dome as that, there ought to be a blue background, but on account of the bad light, it might have to be of the very palest tint. Large figures would be out of place, and life-sized figures would have no effect.

Mr. Penrose wished to remind the meeting that the Apocalypse was the subject now being carried out so far in the designs which had been put up.

Mr. Dawson thought that to picture the dome as the vault of heaven would be a delusion. It should be decorated so as to show itself as a dome supported by the peristyle. There should be no vertical lines to cut up the dome and diminish its size. It should receive, as far as possible, a free treatment, somewhat, perhaps, in the way of zones, and there should be no large figures to diminish it. He believed that gold would give the brightness which was required, and primary colours on white might be introduced with effect.

The Right Hon. G. C. Cavendish-Bentinck, M.P., said he was one of the members of the Committee on the Decoration of St. Paul's, and was one of a small minority who had persistently prevented its destruction by the late Mr. Burges. No man had a greater admiration for Mr. Stevens than he had, but he did not approve of his design for the dome, as it was too ornamental. His own opinion was that it should be treated in a broad way, with pictures which would strike the eye, and not coffered. Far be if from him to depreciate the skill of Mr. Poynter or Sir Frederick Leighton, but few in the room would consider it desirable that the designs now exhibited should be put up in St. Paul's. It was much better that they should be rejected. [This statement was received with partial applause.] Sir James Thornhill's designs were not so bad, after all, when they were compared with the attempts which had since been made, and until somebody was found to surpass Thornhill, they should ask the committee to sit still.

Mr. Brydon agreed with the last speaker. Before they displaced Thornhill's designs they should have something very much better. The Committee had made a mistake in altering the original treatment by Stevens, which was better than the present design. The circles contracted the subjects and gave a certain restlessness which was not found in Thornhill's treatment. The present treatment of the podium was hardly what it ought to be. He thought they were beginning at the wrong end. If they had commenced with the decoration of the choir and nave they would have acquired greater experience for carrying out the important work of the dome.

Mr. Seddon said that he thought Mr. Stannus was to be congratulated, that one at least of the many who differed from him as to the principles for the decoration of the dome of St. Paul's, had had the temerity "to write a book," that is to say, to put on paper some realisation of his idea. The time since last meeting had been short for the purpose, but Messrs. Belham had kindly permitted their artist, Mr. H. Murray, whom he (Mr. Seddon) could claim as having been his pupil as to decorative art, to work out a scheme from his sketches and directions, on the basis of the picture by Sandro Botticelli, that he had referred to. Such as the drawing was, he left it, with deference, for criticism, aware that it must be abundantly open to such; nevertheless, he maintained that he felt confident that the principles upon which it was founded were the correct ones.

* We entirely agree with Mr. Blagrove on this head.—Ed.

Mr. Stannus, in replying, said that in most cases the several speakers seemed to have answered each other. Zonal treatment was a superficial way of treating a great dome; it destroyed all sense of a cupola; and zones were common to cones as well as to hemispheres. He had seen most of the cupolas in Europe, and his experience was directly contrary to that of Mr. Emerson; nearly the whole of them were articulated, and the exceptions only proved the rule. With regard to the effect of a gold ground, he would ask them to go to St. Mark's, and say whether it was undignified or irreligious? Mr. Audsley had suggested several inside zones, but where were they to get room for them all? It would be like the man who wore breeches with horizontal stripes. With regard to the decoration of the podium, he had already stated that the apostle was too large, but this could be corrected. They all agreed with Mr. Armitage as to the necessity of simplicity in the figure drawings. This was essentially an architectural question; and the first thing was to do the best they could for the church in the sub-division. It was beginning at the wrong end to treat it as a gallery for painters. If they took care of the architecture the decoration would take care of itself. The way in which the speakers had differed among themselves, and the ill-considered and unsuitable treaments suggested, only showed that Stevens was not far wrong in what he had suggested. *Quâ* scale, the characteristic treatment of hemispherical cupolas and originality, Stevens's design was incomparably superior to every other. The treatment most suitable for the cupola, they would find, if it were reasoned out mathematically, was the plane treatment of sections which gave circles. This, if carried out, would confer a dignity and distinction to their grand dome, which every other dome in Europe lacked.

The President, in closing the discussion, said he fully agreed with one remark in Mr. Stannus's reply: if they wanted to see how to decorate a dome, he also would say, "Go to St. Mark's!"

Votes of thanks were then passed to Mr. Stannus for his paper, and to the Dean and Chapter of St. Paul's, to Mr. Penrose, and others, for the loan of drawings and models.

At the next meeting a paper will be read by Mr. Lawrence Harvey on "The late Professor Semper's Theory in Relation to Architectural Ornament."

The Drainage of Private Houses.—The near approach of cholera has once more awakened public attention to the necessity of drainage improvements. The newspaper-reading community are called upon to "put their houses in order," and the assurance is given that then the cholera need not be feared. This advice, however, is far easier to give than to carry out. A great number of tenants in London and in many other large towns hold their houses on merely a three years' lease. It is not to be expected that they should incur any considerable expense for improvements which at the end of the short lease would enable the landlord to augment his rent and oust his tenants. On the other hand, the landlord almost invariably refuses to make the required improvements; nor do the sanitary authorities move in the matter unless the nuisance be of a very flagrant description. Finally, there is no fixed official standard as to what constitutes a well-drained house. In this respect the sanitary administration of Brussels is better organised than anything we possess on this side of the Channel. At the Hôtel de Ville of Brussels may be seen specifications given by the Service d'Hygiène of what the law imposes. If any lodger, tenant, or other person have reason to suppose that in any particular house the principles laid down by these specifications are not carried out, he has only to report the fact. An official inspection is at once made. If the landlord inquires from what source the complaint emanated, he is politely informed that that has nothing to do with the question. Either his house is in order, and if so there could be no objection to the fact being confirmed by the official inspector of the town; or the drainage is not in proper condition, and of course it would be only right that he should conform to the general regulations. Thus it is well known what should be done, who should do it, and how that person may be compelled to act, without the tenants or others being involved in any unpleasantness.—*Lancet.*

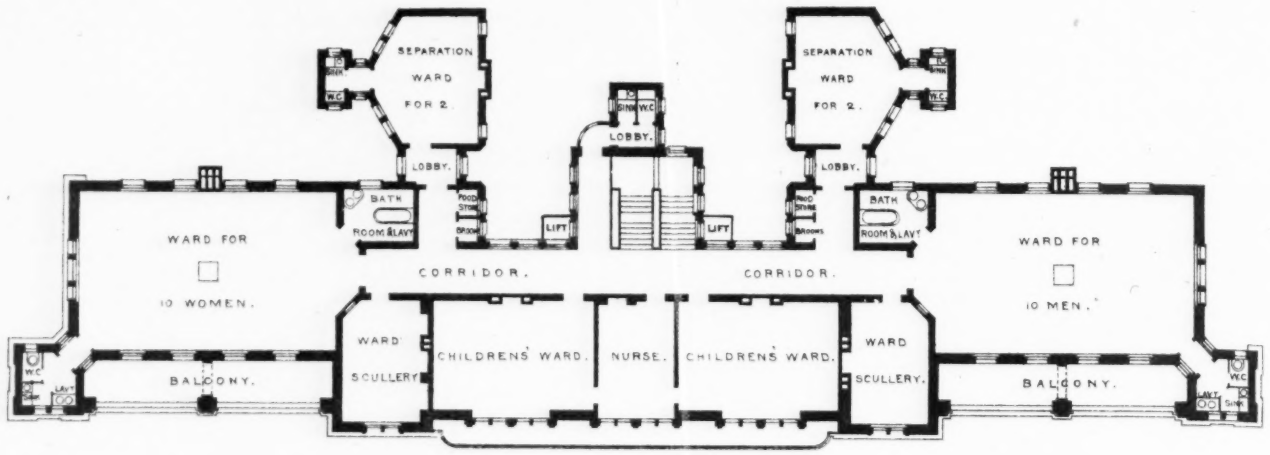
CHURCH OF LA MADELEINE, VÉZELAY.

BOSSES FROM THE VAULT OF THE ANCIENT SACRISTY.

Drawn by M. Adolphe Guillon.

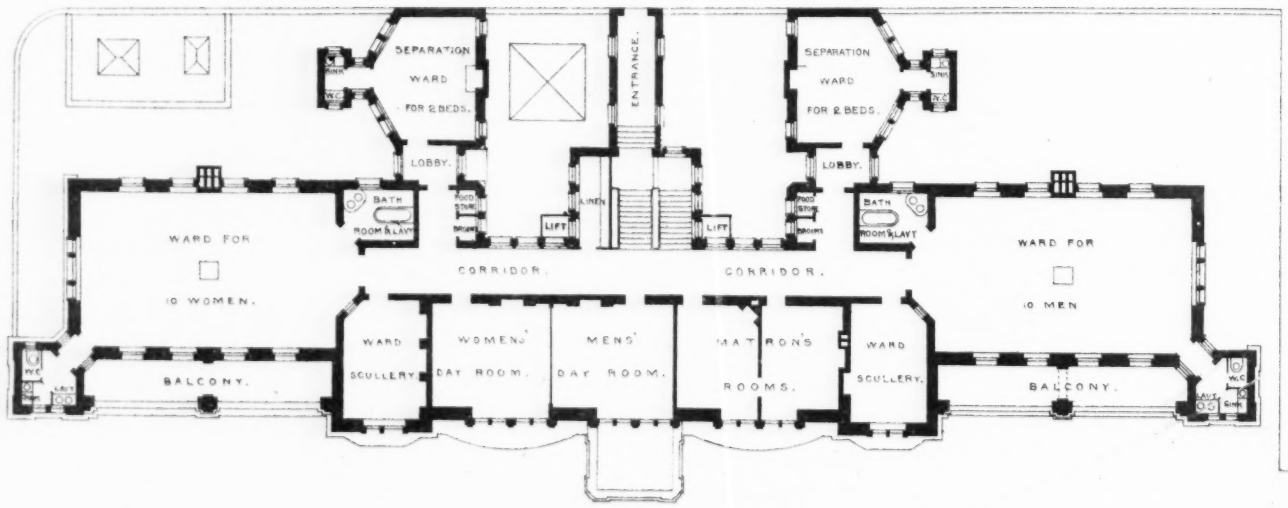
Wyman & Sons, Photo-Litho

Gt Queen St London, WC.



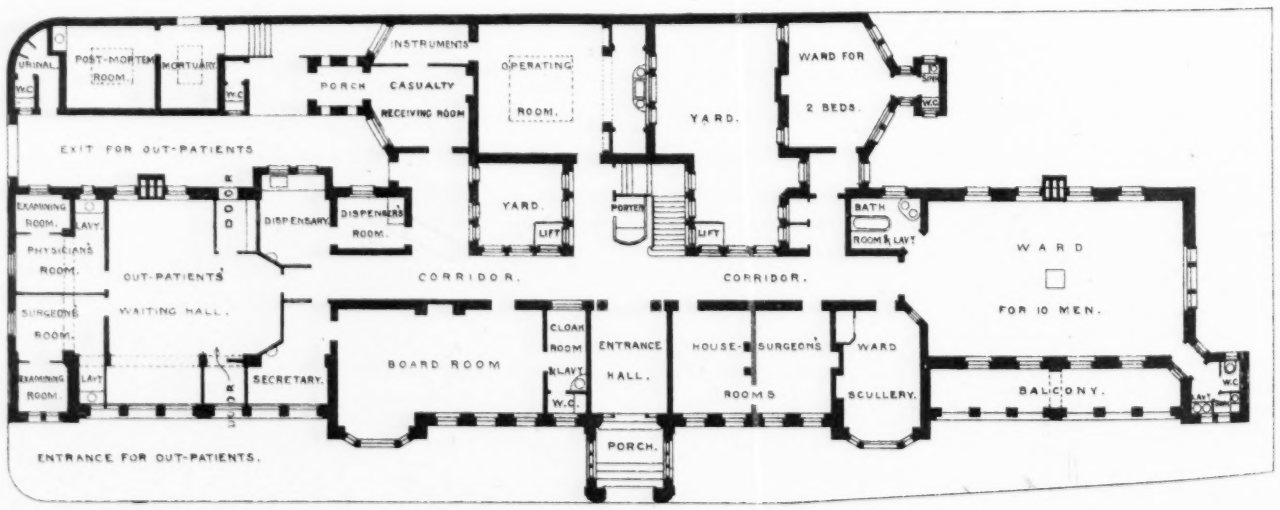
PLAN OF SECOND FLOOR.

Scale of Feet: 0 5 10 20 30 40 50 60 70 80



PLAN OF FIRST FLOOR.

Scale of Feet: 0 5 10 20 30 40 50 60 70 80



PLAN OF GROUND FLOOR.

Scale of Feet: 0 5 10 20 30 40 50 60 70 80

Whiteman & Bass, *Photo-Litho*

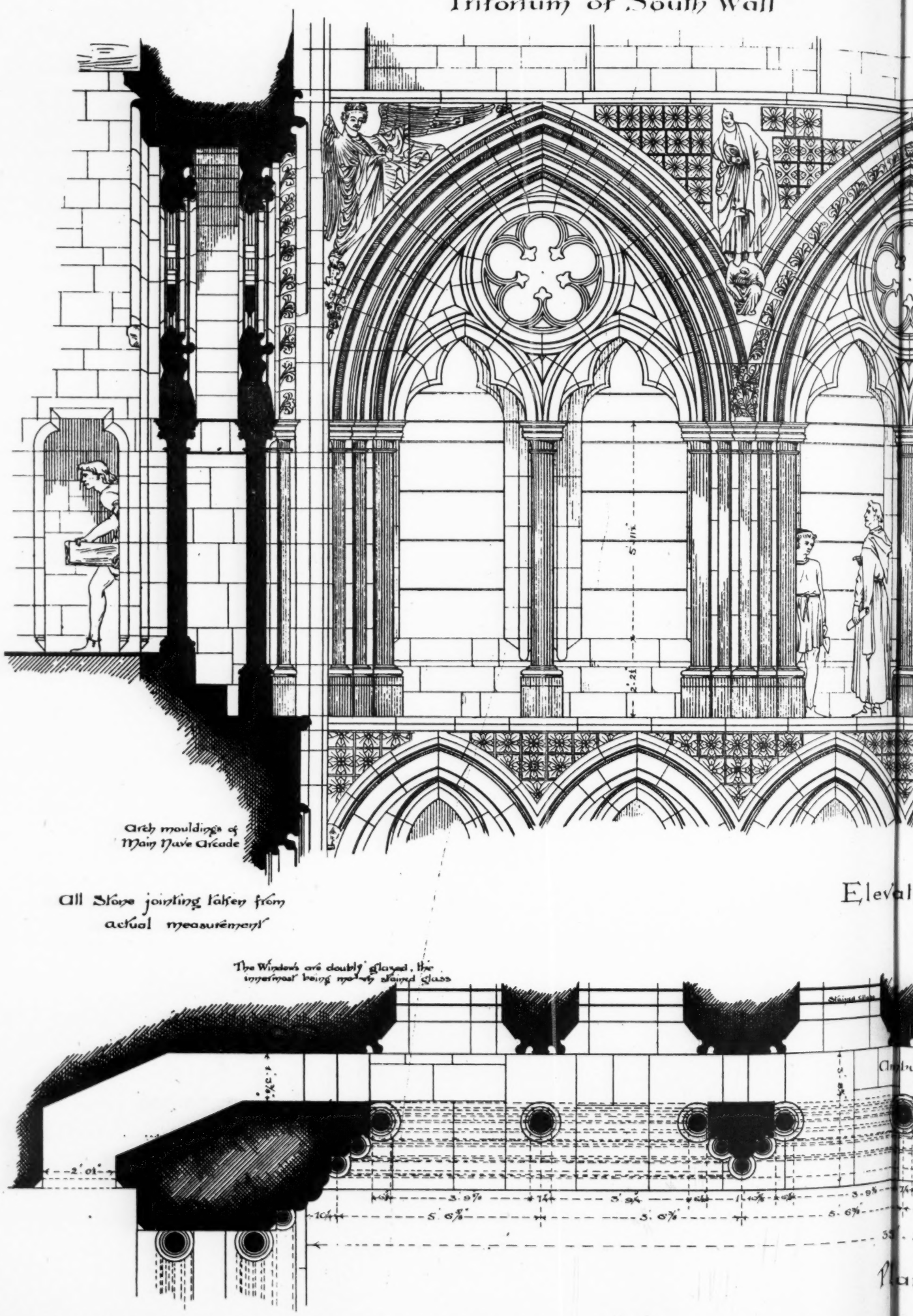
Wyman & Sons, Printers.

EAST SUSSEX, HASTINGS, AND ST. LEONARDS INFIRMARY.

MESSRS. KEITH D. YOUNG AND HENRY HALL, ARCHITECTS.

South Transept Westminster Abbey

Triforium of South Wall



ARCHITECTURAL ASSOCIATION TRAVELLING STUDENTSHIP.

The Pavement of this Stage is uneven

Floor level 51·5" above pavement of abbey

Top of Lancet Window

The figures in East & West spandrils are in good preservation being of very hard stone
The caps. shafts & bases of columns are of Purbeck marble

levation

Scale 0 1 2 3 4 5 6 7 8 9 10 Feet

Ambulatory

1 2 3

1'·10"

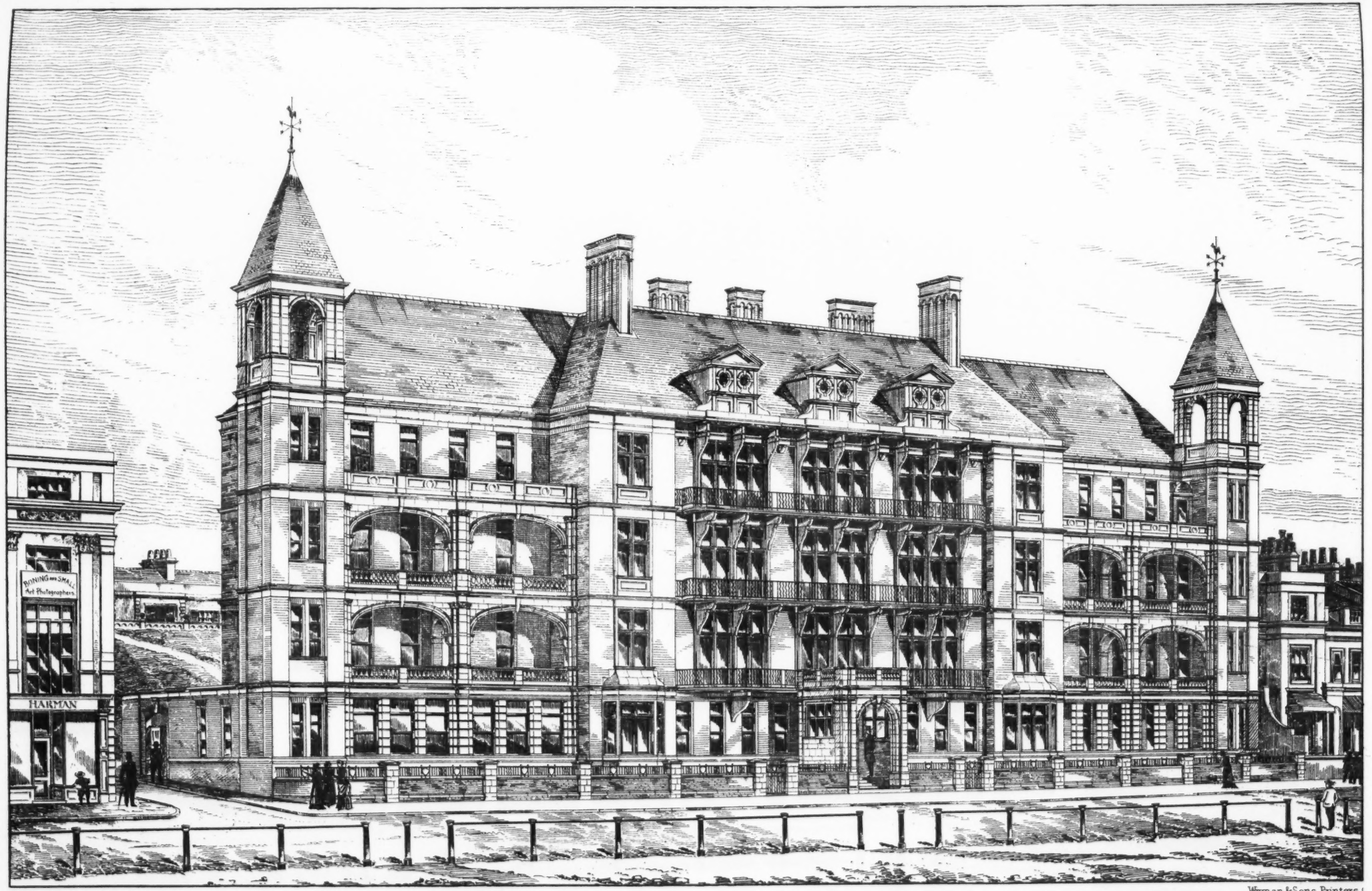
Measured July 1882
Drawn Feb.y 1884
Geo. J. Ostenfeld

3'·9⅞" 6½" 1'·10⅞" 6½" 3'·9½" 7½" 3'·9⅞" 6½"
5'·6⅞" 5'·6½" 5'·6⅞" 1'·1"
33'·2½"

8½"

Plan

Wyman & Sons, Photo-Litho. Co. Queen St. London, W.C.



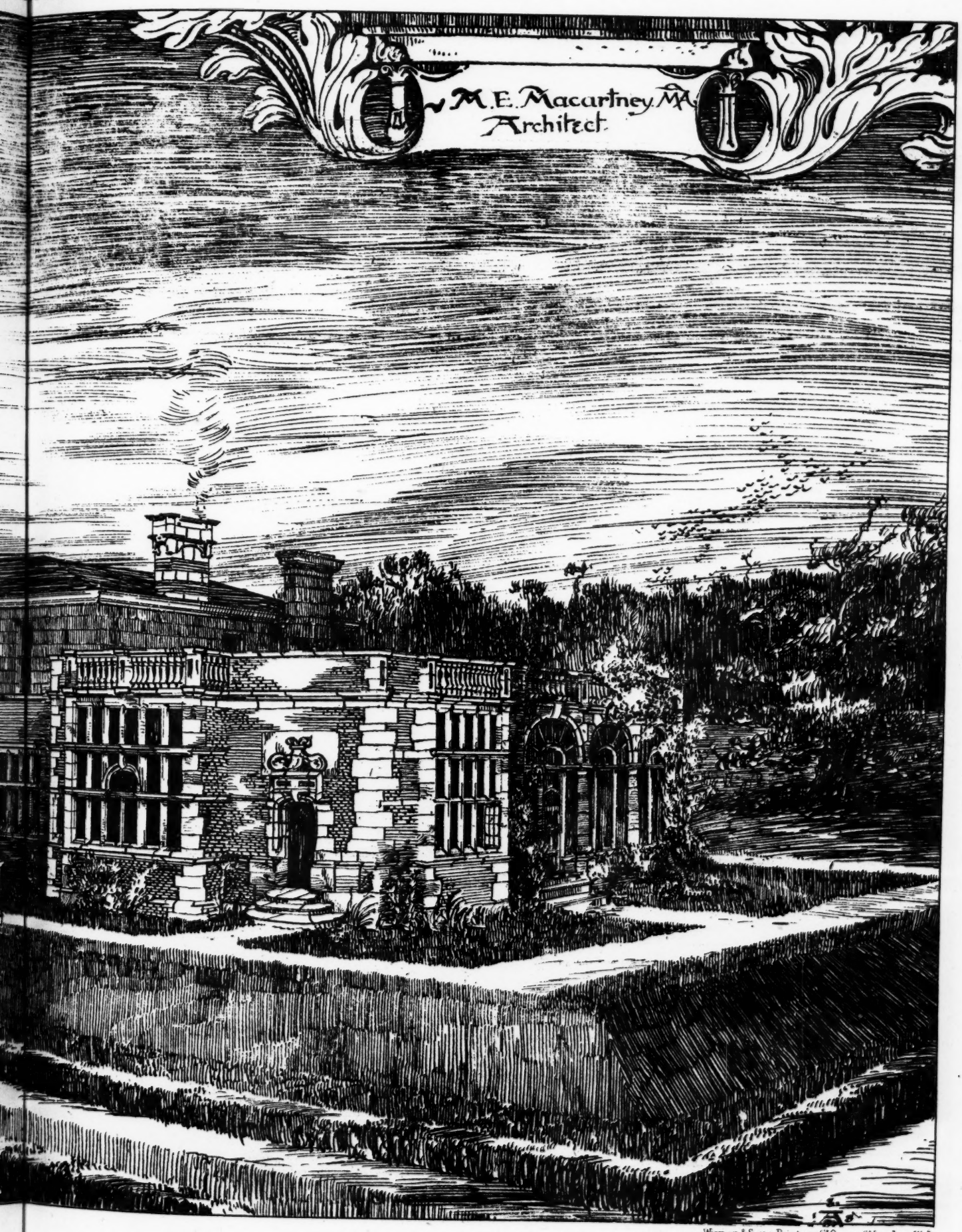
Whiteman & Bass, *Photo-Litho*

Wyman & Sons, Printers.

EAST SUSSEX, HASTINGS, AND ST. LEONARDS INFIRMARY.—Messrs. Keith D. Young and Henry Hall, Architects.

Additions to a House at Tunbridge Wells

Whiteman & Bass, *Photo Litho* 236 High Holborn



Wyman & Sons, Printers, 6 Queen St London, W C

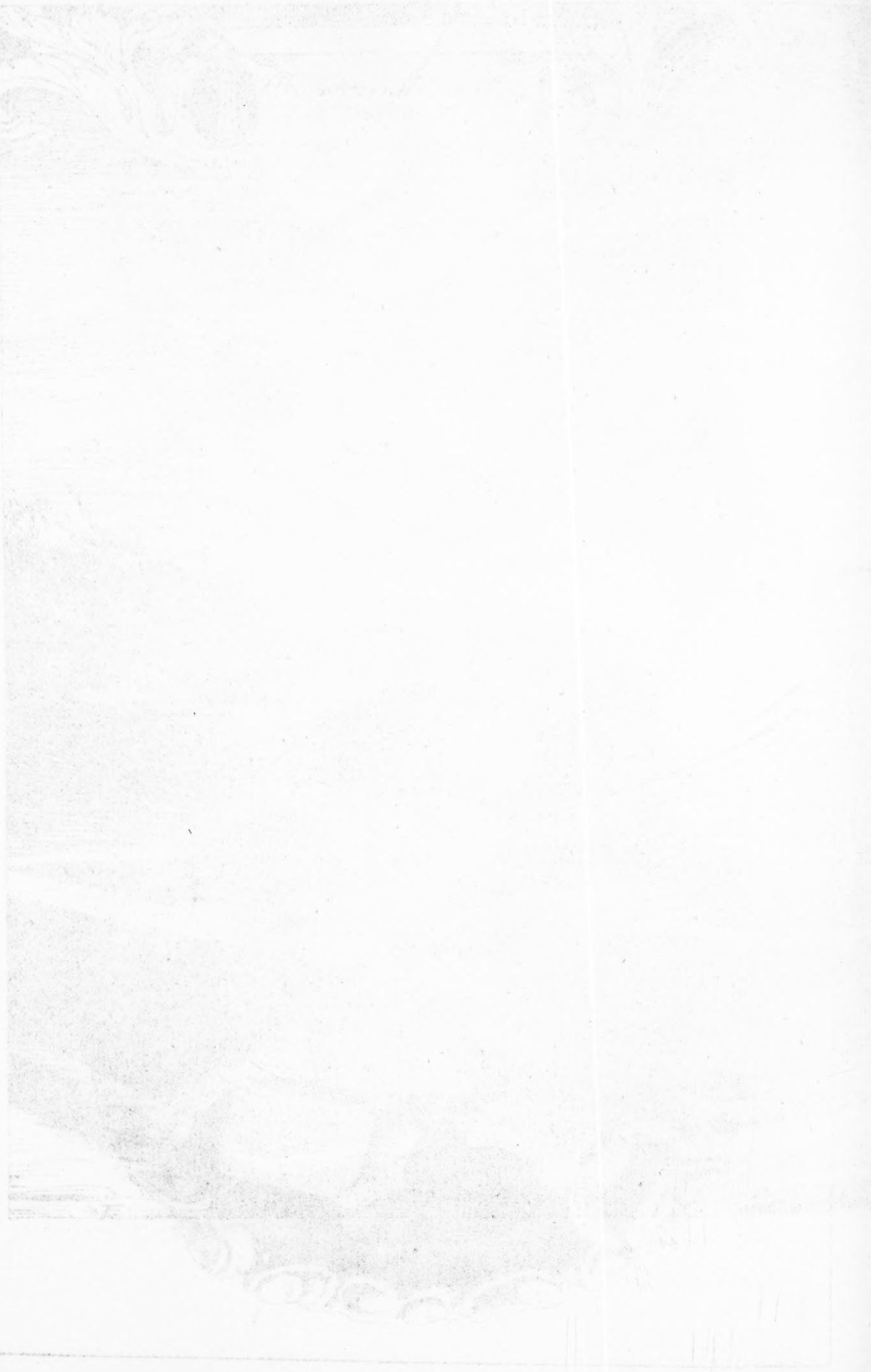
CHURCH OF LA MADELEINE, VÉZELAY.

BOSSES FROM THE VAULT OF THE ANCIENT SACRISTY.

Drawn by M. Adolphe Guillon.

Wyman & Sons, Photo-Litho

C^t Queen S^t London, W.C.



Illustrations.

CARVED BOSSES FROM LA MADELEINE, VÉZELAY.

THESE bold carvings, representing the symbols of the Four Evangelists, are from the roof of the "basse-chapelle," which was formerly the sacristy of the great Romanesque Church at Vézelay. They are reproduced from pen-drawings by M. Adolphe Guillon, the painter, who makes his summer home at Vézelay, and has paid much attention to the history and details of the church. M. Guillon has kindly furnished us with some drawings of other carved work in the church, accompanied by some notes on them and on the building generally, which will appear in our next or in an early number.

SHANDON COURT, TUNBRIDGE WELLS.

THE additions to this house, as well as the stabling and lodge, are being carried out in red brick and stone, with Westmoreland slating. The interior of the house has been entirely remodelled, the main feature being an oak screen and staircase. The work, which is still in progress is being executed by Messrs. Foster & Dicksee, of Rugby, under the direction of Mr. Macartney, the architect.

TRIFORIUM, WESTMINSTER ABBEY.

THIS careful-measured drawing of an exquisite bit of architectural design was one of those which gained its author, Mr. G. J. Oakeshott, the Architectural Association Travelling Studentship earlier in the present year. Well known as the work is, a geometrical drawing of it to scale will not be thought a superfluous publication.

EAST SUSSEX, HASTINGS, AND ST. LEONARDS INFIRMARY, HASTINGS.

THE design which we illustrate to-day is a modification of that submitted by Messrs. Young & Hall, in competition, two years ago, and which obtained the first premium. The original intention of the committee was to erect upon the site of the present infirmary a hospital, with accommodation for 100 beds, and an out-patient department; but in view of the very restricted nature of the ground, and the impossibility of extending it in any direction, it was decided to reduce the number of beds to seventy-five.

The principle frontage of the building faces the sea almost directly opposite the pier, and looks, therefore, almost due south.

The building is four stories in height, with a basement under a portion devoted to stores, cellars, &c.

On the ground-floor the out-patients' department is placed at the west end, advantage being taken of the road which runs at the end and back of the building, to obtain separate entrances and exits. Two rooms for each medical officer in attendance are provided, and in close communication with the waiting-hall are the secretary's office and the dispensary.

At the eastern end of the building is a ward for ten men, with ward scullery (or duty-room) adjoining. The central portion is devoted to the entrance-hall, house surgeon's rooms, and board-room. At the rear is a room for the reception of casualties or accidents, adjoining which is the operating-room. The latter is lighted and ventilated by a large lantern light, and has adjoining it a lavatory and store cupboards, for preparations, &c. In the casualty room is a large cupboard for instruments.

A projecting wing, corresponding to the casualty room, contains a separation ward for two beds, with water-closet and sink. This ward is isolated from the rest of the building by a cross ventilated lobby, and is intended to be used for doubtful cases, or those requiring isolation.

The mortuary and *post-mortem* room are placed in the north-west corner of the site.

The first floor contains a ward for ten men, a similar one for ten women, and two isolation wards as described above. The water-closets, &c., are placed in the angle towers, and cut off from the wards by cross ventilated lobbies. To each ward is provided a bath-room and lavatory, a food store, and cupboard for brooms, &c., and a ward scullery, or duty-room. The central portion of the front is occupied by the matron's rooms, and two day-rooms, one for each sex, which can be thrown into one for use as a chapel, or for entertainments. On this floor access is obtained to the road at the back.

The second floor is similar to the last, except that the central portion is devoted to two children's wards, with nurses' room between.

The top floor contains one women's ward and a separation ward, the kitchen, offices, and the nurses' and servants' sleeping apartments and day-room.

Balconies are provided to all the wards, except the separation wards.

The large wards will all be warmed by double ventilating grates, specially designed by Mr. D. O. Boyd, with glazed tile sides and descending flues. The smoke-flues and extraction-flues are all carried up on the exterior wall, and so arranged as to be swept from the outside. The corridors and passages, out-patient department, will all be warmed by hot-water coils, and the grates in all the smaller wards will be Boyd's Hygiastic Grates.

Two lifts are provided, one for the conveyance of coals from the basement to the several floors. This lift will be a framework of ironwork, without any enclosure, the other for the conveyance of stores from the basement to the kitchen. This will necessarily be enclosed, but will communicate with the basements and third floors only, thus avoiding any possibility of its being a shaft for the conveyance of air from one ward floor to another.

The principal front is intended to be faced with red brick and Portland Stone, and from its prominent position is designed in somewhat more ornate a manner than is generally the case with hospitals.

THE PLUMBERS' COMPANY AND TECHNICAL EDUCATION.

MR. GEORGE SHAW, C.C, and the Wardens of the Plumbers' Company, entertained a large number of gentlemen to dinner at the Albion, Aldersgate-street, on Wednesday evening, in commemoration of the Company's recent action in regard to the technical education of plumbers, and with especial reference to the Plumbers' Congress, which was reported by us at some length a few weeks ago.* Many of the gentlemen who came from all parts of the United Kingdom to attend that congress were present at the banquet.

The Right Hon. A. J. B. Beresford Hope, M.P., in replying to the toast of "The Houses of Parliament," congratulated the Company upon its efforts to make the Guild a reality, and referred to the prominent part which the Master took, in conjunction with representatives of other City companies, in carrying into effect that piquant and delightful feature of the recent Health Exhibition, "Old London."

Among the other toasts was "The Plumbers' Congress," in proposing which the Master observed that for several years past the Company had given attention to the promotion of technical excellence on the part of workmen in the craft with which its name was identified, and had instituted a system of examinations for workmen, by passing which a man might become entitled to the freedom of the Company, and to receive a sort of diploma or certificate of competence. The Company had also assisted in the formation and support of the City and Guilds of London Technical Institute; and, lastly, under its auspices was held the very practical Congress of Plumbers, attended by representative craftsmen from all parts of the kingdom. At that Congress important resolutions were passed, and steps were now being taken to give practical effect to them. In this work he believed the Company would be able to take an active part, for some of the powers which had been conferred upon it by charter centuries ago were applicable to the circumstances of the trade in the present day, and if the Company could secure the co-operation of the Metropolitan Board of Works, and of other local bodies, it would be able to do much to ensure good plumbing,—one of the most important elements in a healthy house. The full official report of the Congress was now issued, and would be found full of valuable and suggestive matter. With the toast he had great pleasure in coupling the names of Mr. George Godwin and Mr. Philip Magnus. Mr. Godwin had done so much for many years past in furthering the main object of the Congress,—*i.e.*, in promoting the health of the people,—that it was only right to associate his name with the great cause of sanitary reform. Mr. Magnus was well known as the Director of the City and Guilds of London Institute.

Mr. Godwin, in the course of his reply, said it was impossible to over-estimate the importance of the deliberations of the Plumbers' Congress, just as it was impossible to estimate the damage and loss of health and life caused by bad plumbing. The late Serjeant Parry and his wife owed their death to a bad joint in plumbers' work. Plumbing was called an "art and mystery" when the Company received its charter, and certainly since that time the plumbers had contrived to keep their work a "mystery," by hiding it and covering it up to an extent that very often made it impossible to get at without incurring great expense. He trusted that the Congress would bear good fruit. The report of its proceedings was exceedingly valuable, and ought to be distributed all over the country. If any special fund were raised for that purpose, he should be pleased to contribute.

Mr. Magnus said that if there was any practical branch of industry to which the principles of science might be considered applicable, it was plumbing.

Mr. Digby Seymour, Q.C., in an eloquent speech, proposed the health of the Master of the Company, to whose energy were to be attributed the steps which had been taken by the Company in promoting technical education for members of the craft. It had been due to the elevation to the chair of the Company of so practical and experienced a plumber as Mr. Shaw that some of the powers which were conferred upon the Company by its charter had a good prospect of being revived, to the benefit, not merely of the trade, but of the public at large.

The Master, in proposing "The Plumbers' Company," quoted from a handbill which had been distributed by a man who expressed his willingness to undertake "plumbing or general house repairs," and to take "any old lumber in payment." Such offers as this showed the great importance to the public of the steps which had been taken by the Company to secure competent plumbers.

* See *Builder*, p. 553.

BRITISH MUSEUM LECTURES ON ASSYRIAN ANTIQUITIES.

IN the galleries of the British Museum, Mr. W. St. Chad Boscawen commenced on Wednesday afternoon a series of six afternoon lectures on the history and antiquities of the Assyrian and Babylonian empires. The subject of the opening lecture was the "Origin, Development, and Decipherment of the Cuneiform Inscriptions," and in addition to the inscriptions exhibited, the lecturer had a number of maps and diagrams to explain the subject. Mr. Boscawen said that the inscriptions in the cuneiform character have carried us back to an antiquity so remote that it would seem as though we were within measurable distance of "the threshold of history." In the simple, once-pictorial, characters of the cuneiform syllabary we have a picture of the home of the inventor, his natural surroundings and animal companions. The lecturer then proceeded to show that the evidence afforded by the analysis of the character of the syllabary showed the inventors to be a people dwelling in caves in a mountain land where the pine and the vine grow, and where the bear and the wolf were the enemies of man; and where snow-capped mountains formed the resting-places of the gods. That this was not Babylonia was at once apparent. The lecturer then proceeded to show that it was a tribe called the Akkadians who first worked out the elements of civilisation in the mountains of Southern Kurdistan, and brought them thence to the fertile plains of Shinar, and founded the tetrapolis of Nimrod. Some indication of the great antiquity was afforded by the fact that the inscription of Sargon of Agadhe, the date of which is now firmly established as B.C. 3750, was written in phonetic characters, thus indicating centuries of growth and development prior to that remote time. Mr. Boscawen then described the way in which the cuneiform writing was borrowed by the Semitic people who had left their desert home to come and dwell in the cities of Chaldea. It was evident that trade had been the incentive, and that in adopting the writing they had exercised the same power of analysis and simplification as that which had enabled them to

develop the Phœnician alphabet from the hieratic of Egypt. It was for these early traders that the syllabaries and bilingual tablets, full of the phrases of the market and the law court, had been drawn up. The cursive writing found in the valuable commercial and legal tablets from Waska—discovered by Mr. Lofts—was evidently the basis of the script of Nineveh and of the later Babylonian Empire. Mr. Boscawen then proceeded to show how the writing was transmitted from one nation to another. The Semites who left Babylon took with them the writing which became the beautiful court-hand of Nineveh. The lecturer then proceeded to show how the great linguistic families were represented in the cuneiform literature.

The remaining five lectures of the course will be delivered on the following dates, viz., December 10, 17, and 31; and January 7 and 14,—each day at 2.30 p.m.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—The first ordinary meeting of the current session was held at Queen's College on Tuesday evening, December 2nd. The vice-president, Mr. W. H. Kendrick, was in the chair. The hon. secretary (Mr. Victor Scruton) read the report and balance-sheet for the past session, and pointed out that the financial position of the Association had never been so satisfactory as at the present time. The following gentlemen were nominated for membership:— Mr. F. J. Yates as an honorary member, and Messrs. W. S. Midgley and S. Payton as ordinary members. A paper was then read by Mr. T. W. F. Newton, entitled "The English Villa." A discussion ensued, and, after a hearty vote of thanks to the author, the meeting terminated.

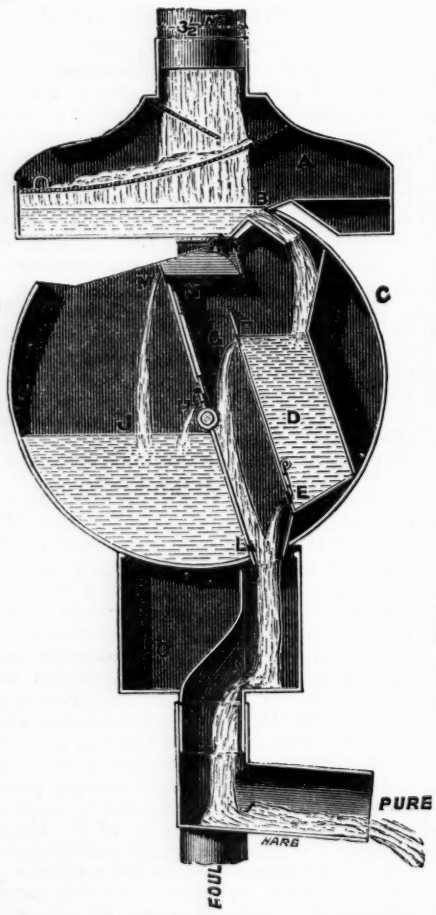
Leeds and Yorkshire Architectural Society.—At a meeting of this Society, held on Monday evening, Mr. T. Pridgin Teale delivered a "conversational address on fire-places." Mr. Teale said he had accepted the invitation to lecture in connexion with that society in the hope of enlisting the judgment, the sympathies, and the active help of a profession which could do more than any other body of men to further the object he had set before him. That object was to revolutionise the fire-places of the kingdom, whereby coal could be burned more effectively and economically as a producer of heat, and at the same time the production of smoke be very materially reduced. In the national work of smoke abatement the architectural profession could give most efficient aid, as in its hands rested almost invariably the designing of the fire-places of new buildings. He had discovered that nearly every existing fire-place could be made more effective, more perfect in the combustion of cinders, and more cleanly, without any structural alteration, by the simple expedient of closing the hearth chamber with a movable shield, which he had called an "economiser."

Edinburgh Architectural Association.—The usual fortnightly meeting of this Association was held in the Professional Hall on Monday night. The President, Mr. G. Washington Browne, was in the chair, and after some preliminary business, introduced Mr. James Anderson, who read a paper entitled "Roofing Slates and Slating." The lecturer, having treated of the geological nature of slate, proceeded to treat of slating, as to which he said the English and foreign style was to use slates of one size from eaves to ridge, fixed to laths, and pointed with lime inside, the slates being of the lightest description. The Scotch style was to use thick slates of various sizes, arranged before commencing, and fixed to sarking-boards. The largest slates were put on at the eaves, and then diminished in size to the ridge. The tile-stones, or grey slates of Forfar and Caithness, were those with which a large portion of Old Edinburgh had been slated. They were hung on laths, with pins of oak, pine, and other woods, as well as with the bones of small animals. There were three most important points to be looked to in slating,—the pitch of the roof, the cover, and the bond of the slates. The pitch should be as nearly square pitch as possible. The cover should be, on a good pitch, from 3 in. at eaves to 1½ in. at ridge. Should the roof be deep or the pitch flat more cover ought to be given. Sometimes 7 in. to 8 in. of cover was necessary at the eaves where the wall-head was broad. It was impossible to give short and thick slates more than about 2 in. cover, as the tails would be tilted. The bond was quite as important as the cover in keeping roofs water-tight, for, if the bond were insufficient the cover was of no avail The bond on the slates should not be less than 3 in. or 4 in. at eaves to 2 in. at ridge. In conclusion, the lecturer said he would impress upon architects the necessity of providing easy access to chimney-heads and avoiding traffic on the slates. These accesses need not be unsightly to be efficient, and roofs so protected would not require repairs for many years.

ROBERTS'S RAIN-WATER SEPARATOR.

We give a section of this clever contrivance for approximately separating the foul from the cleaner water of rainfall. The detailed description is as follows:—

A. Removable strainer with perforated plate to prevent rubbish passing into separator. B. Outlet for water to pass to separator. C. Separator balanced on pivot. D. Small compartment into which the rain-water first falls. E. Small hole fitted with washer proportioned to size of roof. F. Larger hole to take the overflow from D during moderate rain. G. Discharge-pipe. In a storm the water fills the compartment D, and flows over the top of this pipe. H. Small holes at back of G between compartments. When the rainfall exceeds the discharging capacity of hole E, the water rises in compartment D, and passing through holes H, slowly fills compartment J. When the weight of water in J overbalances the separator, it is canted (as shown in drawing), and the water (by that time pure) directed by the discharge-pipe G into the storage-pipe K. L. Small hole at bottom of compartment J. M M. Auxiliary-pipe for keeping compartment J full after the separator is canted when the rain is leaving off, so that the last drop of rain may be stored. By raising the slide N a third and a fourth hole can be opened at H; this will cause the compartment J to fill more rapidly. The whole of the water passes through the discharge-pipe G which conveys it into the waste-pipe O so long as it remains uncanted. The length of time it remains in this position, running the water to waste, is regulated by the slide N to suit the smokiness of the locality. The dotted lines down the centre indicate the position of the iron frame to which the apparatus is attached, provided with holes for fixing to the wall.



Section of Separator in action: Pure Water passing to storage.

The State of the Thames.—The condition of the Thames at Twickenham has become very bad, and the Twickenham Local Board, dissatisfied with the steps taken by the Conservators, have unanimously resolved to request the Local Government Board to receive a deputation upon the subject, and to ask the county members and all other Parliamentary representatives interested in the matter to accompany them. Strong remarks were made upon the alleged apathy of the Conservators in allowing so great and dangerous a nuisance to exist, the vast accumulations of sewage mud on foreshores being specially referred to.—*Times.*

MR. COMMISSIONER KERR ON ARCHITECTS' COMMISSIONS.

At a meeting of the St. Pancras Board of Guardians, held at the Vestry-hall on the 27th ult., on the question of warming the St. Pancras Infirmary at Highgate a desultory conversation occurred over the proposal to ask Mr. Bridgman, the Guardians' architect, to propose a plan for the new warming apparatus.

The Chairman (Mr. Commissioner Kerr), repeating an observation he has several times made respecting "the waste of the ratepayers' money in paying architects these commissions," said this job would probably cost 2,000*l.*, and five per cent. upon that would just put about 100*l.* into Mr. Bridgman's pocket, which might all be saved if the Board did as any private person would do, viz., lay out 5s. in an advertisement for plans and estimates, and they would get dozens without costing the parish a penny.(!)

Mr. Robinson and Mr. Drew thought it would be dangerous to let strangers come in and pull the workhouse to pieces without an architect's supervision.

Ultimately it was explained that though the Committee had given partial instructions to Mr. Bridgman, the parish would not be liable if the work was not done.

ARAB ART.

Sir,—In your notice [p. 684, *ante*] of Mr. Reginald Stuart Poole's very interesting lecture on the domestic architecture of Cairo, you were kind enough to speak in terms of approval of some drawings of mine to which Mr. Poole referred in illustration of his remarks.

Fully conscious that these drawings, partly from smallness of scale, do not adequately explain the materials employed in the construction of the ceiling, and in the mural decoration of Cairo houses, I trust you will allow me to supplement them by a few observations tending to show that in strength and solidity they yield in no respect to European structures, and that they are, in many respects, more calculated to resist the vicissitudes of a Northern climate than our own dwellings.

I am fully aware of the difficulties which beset a layman in discussing questions relating to architecture; it is, therefore, with great diffidence that I venture to dissent from some of your remarks concerning the construction of Saracenic buildings in Egypt. The ceilings, so far as I can recollect, were never of plaster, but of solid wood, the beams being in some cases exposed to view, and richly decorated, or, in other instances, planked and enriched by thin laths nailed upon the surface in geometrical patterns. The stalactites and honeycombed recesses were also of wood, thinly plastered and then gilt. Good examples of this work are to be seen at South Kensington, in a collection the value of which it is to be hoped will some day be enhanced by sufficient space being allotted to it.

The use of tiles for wall decoration is by no means universal in Cairo; but where they occur their value in the general scheme of colour is incontestable, and the facility with which they admit of cleaning would render them peculiarly appropriate for use in our smoky cities.

The use of plaster for mural decoration seems to have been adopted by that branch of the Arab race which settled in the Barbary States and in Spain, where, as in the Alhambra, it is employed perhaps to excess, but with such exquisite taste that few could cavil at its adoption.

A style at once more manly and better adapted to domestic architecture prevails in Cairo, and it is with special reference to the conservation and the better understanding of that branch of the art that the promoters of the movement, with which I am glad to see you sympathise, now desire to call attention.

I trust that you will afford me the opportunity of bearing testimony to the soundness of Mr. Poole's views as to the value of the study of Saracenic art. Frank Dillon.

*** The value of the study we never questioned; only the application which seemed to be suggested.

Letts's Diaries.—The series for the year 1885 is now out, and fully sustains the character which this collection of business memorandum books has long enjoyed for constantly-increasing excellence and completeness.

THE DOME OF ST. PAUL'S.

SIR,—If you are publishing the discussion which took place at the Institute on Monday last I should be obliged if you can find place for the following notes on Mr. Stannus's winding-up speech.

He dismissed the remarks I had made with the statement that I was unfair in my sweeping assertions and in quoting the examples I did, as his outline illustrations on the wall showed distinctly articulation, and that he had purposely kept out of the discussion Oriental domes, the question referring only to Occidental domes.

The examples quoted by me were all the largest and most important domes in the world, while of the few he had drawn with which to illustrate his supposed axiom, there were only two of any size or importance, and most of them articulate with the parts immediately under the cupola, and not particularly with the main subjacent divisions or axes, which is the real point of my argument, as I maintain this principle throws the cupola out of scale.

Again, whatever in principle applies to one large dome applies to another, but what applies to a small dome is absolutely inapplicable to a large one, whose effect depends upon its size.

Also to discard Oriental domes is absurd, and evidently a sign of weakness, for the principle applies equally to Oriental and Occidental domes, and the East has supplied us with infinitely more examples of broad domical treatment than the West. It is not a question of detail, but principle.

I may say I have been obliged to study the question of domes, having had to design three, which have been erected; and with the exception of four of the examples quoted, I have seen them all.

With regard to the drawing of eccentric circles on a black-board, put forward by Mr. Stannus as illustrating the effect of a zonal treatment, it was simply puerile, for without the most wonderful shading and aërial perspective, the effect of a dome could not be shown in that way at all; and without the subjacent parts,—which the eye cannot help seeing in a measure,—in reality, even the faintest true relative effect could not be obtained. This was clearly demonstrated by the clever water-colour drawing on the same principle exhibited in the room.

I feel constrained to put forward these few remarks, being sure that no one competent to judge can help feeling that Mr. Stannus's design is simply a bad emasculation of Stevens's, which latter, whether correct in principle or not, would at least be in scale with the cathedral, being divided into more parts.

It is a broad fact that if large figure subjects are introduced in connexion with false architectural lines, the dome will be utterly spoiled as to its grandeur, for the divisions must be too large and out of scale, and Stevens evidently felt this. WM. EMERSON, F.R.I.B.A.

THE WATERLOO WELL, KILBURN.

SIR,—Many of your readers, in taking a trip by road to rural Willesden, will miss the Waterloo Mansions which extended along the high-road from Willesden to the Brewery, Kilburn. The mansions are fast disappearing, and the estate will soon be offered to the public for building purposes. They belonged to the Buckley family, of which the late Rev. — Buckley, vicar of St. Mary's, Paddington-green, was a prominent member, and were built about the Waterloo year and named after the victory that destroyed the power of Napoleon Buonaparte and established the *prestige* of England. Among the rest the well that specially commemorated the event and supplied the estate with water until superseded by the mains of the West Middlesex Waterworks Company, is doomed, and, in due course, is to be filled up. Can nothing be done to preserve a historical monument mentioned in "Old England"? Last week, Mr. Benjamin Barlow, Plaistow, and Mr. George Austin, London, the gentlemen superintending the demolition, descended the well to make a survey. To their courtesy I am indebted for the following information:—

The well throughout is built of brick and cement. It is 8 ft. in diameter and 400 ft. deep. From the surface to the level of the water the distance is 170 ft., while the water measures no less than 230 ft. to the bottom. At 330 ft. there is a bed of chalk. This had to be bored some 70 ft. before the spring was gained. The well was supplied with pumping machinery and a pump. The latter is fixed 50 ft. under the water. When originally sunk a man was appointed at 7s. the week to pump for the estate, and supplemented his income by charging ½d. to every visitor for water to the well, and 1½d. for distribution among the cottages in the neighbourhood. The well adjoins the pavement in the high-road, and is between the garden-wall of Nos. 3 and 4, Waterloo.

WILLIAM GEORGE DE GRUYTHER.

Kilburn, Nov. 26, 1884.

LEASEHOLD AND FREEHOLD TENURES.

SIR,—It is very much the fashion to attribute the evils of modern housebuilding to the restrictions of leasehold tenure. After some experience of building estates, I have arrived at the opposite conclusion. Many years ago, hoping that freehold tenure might induce builders to erect a more substantial class of house, I advocated the adoption of that system. The result has proved that the builder, left to himself, even with restrictive covenants, runs up worse buildings on freehold than on leasehold land. He will build that which will produce the highest price at least cost to himself. *Caveat emptor.*

ARTHUR J. BAKER.

STONE BRIDGES.

SIR,—Would you, or any of your correspondents, kindly oblige me with information on the following points?

1. Which were the earliest *stone* bridges built in England and in Scotland?
2. Which are the oldest stone bridges now existing in England and Scotland?
3. What are the best books to consult regarding them?

W. S.

CHURCH BUILDING NEWS.

Birmingham.—The Bishop of Worcester has consecrated the first portion of the Church of St. Agnes, Moseley, near Birmingham, which has been erected on a site given by Mr. F. Willmot. The portion of the church now finished includes the chancel, clergy and choir vestries, organ-chamber, and about one-third of the nave. The style of the building is Gothic, of the Geometrical character, with somewhat elaborate ornamentation. The extension of the nave and aisles, and the erection of a north porch with tower and spire, are left to the future. The architect under whose superintendence the church has been carried out is Mr. William Davis, of Colmore-row, Birmingham, whose plans were selected in competition; the builder is Mr. W. Bloore, of Aston New Town.

North Berwick.—The Bishop of Edinburgh has laid the foundation-stone of the new chancel of St. Baldred's Church, North Berwick. The sum of 1,000*l.* having been collected by the incumbent, the trustees sanctioned the commencement of the work, which includes a chancel of 18 ft. 6 in. long, the widening of the old apse on each side, the construction of an organ-chamber and a clergy vestry on the north side of the chancel, and the moving of the belfry from the west to the junction of the chancel and nave. The whole improvements are to be carried out under the direction of Messrs. Seymour & Kinross, Edinburgh, and it is hoped that they will be completed by Easter.

Pennycomequick (Devonport).—A meeting of the parishioners has been held to consider the steps to be taken to provide church accommodation for the new population which has sprung up in the eastern side of the parish of Stoke Damerel. The Rev. W. St. Aubyn, the rector, presided, and explained that it was proposed to build in sections a new church on a site which would be given by Sir John St. Aubyn in the land opposite Stuart-terrace, on the Pennycomequick-road, and that he had funds at his disposal which would meet the greater part of the cost of the first section. Plans prepared by Mr. J. P. St. Aubyn were examined and considered. It was resolved that it was desirable that the proposed church should be built, and the first section proceeded with as soon as practicable.

Birtley.—Birtley Church, North Tyne, has been opened by the Bishop of Newcastle, after having been closed for six months for restoration. The total cost of the work executed has been 1,300*l.* Mr. Arthur B. Plummer, of Newcastle, is the architect; Mr. William Welton, of Birtley, is the contractor for the masonry, &c.; and Mr. William Knox, of Consett, for the carpentry. The east end has been entirely rebuilt, and Mr. Coppin has presented stained-glass windows by Messrs. Powell, of London, for the three lancet lights. A stained-glass window by Messrs. Wailes & Strang, of Newcastle, has also been presented by Messrs. A. & W. and Miss Robson for the nave. An aumbry and other ancient remains were discovered in the course of the work. The tiles in the chancel have been laid by Messrs. W. B. Wilkinson & Co., of Newcastle, and the ironwork is by Mr. Smith, of Hexham.

Blackburn.—The foundation-stone has been laid of a new church in St. Paul's parish, Blackburn, dedicated to St. Barnabas. The building will be in the Early English style of architecture, and will contain 722 sittings. The estimated cost is about 7,000*l.* Mr. Varley, of Blackburn, is the architect.

Staverton.—Staverton Church has been reopened, after restoration. The cost of the work has been 900*l.* The present church consists of a fine and lofty tower, with a nave, north aisle, and chancel, erected probably about A.D. 1350-1370, some of the windows, however, being of an earlier, and some of a later date. The restoration has comprised a new nave roof, new wood and tile floors in the nave, and new stone floors in the chancel, open bench seats of pitch pine being provided for the nave in place of the old pews, and choir stalls of the same material for the chancel. The western gallery has been removed and the tower arch opened out, the ringers being provided for by an intermediate floor. The plastering of the walls has been removed, the masonry being neatly pointed instead, which gives a pleasant effect to the interior. A warming apparatus, by Porritt, of Leicester, has been fixed under the nave floor. The works have been carried out by Mr. Gee, of Daventry, under the superintendence of Mr. H. M. Townsend, architect, of Peterborough.

Ongar (Essex).—The old church of St. Martin, at Chipping Ongar, has just had a new south aisle added to it, from the designs of Mr. C. C. Rolfe, architect, Oxford. Much of the ancient edifice dates from a remote period, and the south wall, which was taken down to make way for the extensions, was over 3 ft. thick, and composed in the main of old Roman tiles, measuring 1 ft. 3 in. by 7½ in., and varying from 1¼ in. to 1½ in. thick, and flints, all so firmly concreted together that their tearing asunder was a work of great difficulty. The new aisle is Early English in character, and built of red brick, with Bath stone dressings. The windows are triple lights, and the roof is covered with sheet lead. A stone arcade now divides the nave from the new aisle. The roof is exceptionally massive in its construction, and entirely of English oak. It is ornamented by bosses, spandrels, and pateræ, carved in the solid wall-plates, and the sculptured oak angels, each projecting 4 ft. 6 in., and bearing shields on which are carved the emblems of the Passion, form a conspicuous feature. These figures, and the stone and wood carving generally, have been carried out by Mr. Harry Hems, of Exeter. The new seating is of oak, the bench ends having foliated terminations. Mr. F. Noble, builder, of Ongar, carried out the masonry and brickwork, and Mr. H. Barlow, of the same place, the woodwork.

Aston Rouant.—The parish church of St. Peter and St. Paul, which has been recently restored, consists of nave, chancel, and western tower, with short north and south aisles. The walls of the nave are of the twelfth century, and there are remains of the twelfth-century windows and a door. Previously to the restoration it had become much mutilated, and at the western end the walls were tied together with iron bars. There was a western gallery blocking up a very beautiful and early fourteenth-century arch leading into the tower. An interesting feature in the work was the discovery of the original altar slab with the consecration crosses thereon still visible. This massive slab of stone has been mounted upon an oak frame and now stands a "movable table," though weighing scarcely anything less than a ton. The walls of the church are mostly of flint, and some excellent work has been done in the way of faced flint work by the builders. The work to the chancel was done by Mr. A. Groves, of Milton-under-Wychwood, and the remainder by Messrs. Silver, Sons, & Filewood, of Maidenhead, the whole being from the designs and under the direction of Mr. Edward G. Bruton, of Oxford, architect, and surveyor for the diocese.

Female School of Art.—Her Majesty the Queen has shown her appreciation of the work done in the Female School of Art, Queen-square, Bloomsbury, by purchasing seven fans of original design painted on silk, which were included in the late Exhibition of students' works.

DISSENTING CHURCH-BUILDING NEWS.

Croydon.—A Congregational church is about to be erected in the London-road, West Croydon, for the Rev. J. P. Wilson, from designs prepared by Mr. W. D. Church, architect, South-place, Finsbury. Accommodation is provided for nearly 1,000 persons. The building will be in the Early Decorated style.

Edinburgh. — The foundation-stone has been laid of a new church in Drumsheugh-gardens, for the congregation of Free St. Andrew's, which is to supersede the present church in George-street. The new church is to be Renaissance in style, from the designs of Messrs. Douglas & Sellar, of Glasgow. It will have an imposing frontage, rising to a height of 100 ft. Three arched gateways open into a large vestibule, from which branches off a corridor encircling the whole interior, affording ready access to all parts of the area. A large gallery is placed over the vestibule, and narrow galleries will pass along two sides. The interior is to be lighted by sixteen large windows, placed in a clearstory. The cost of the new building will be about 15,000*l.*

St. Stephen's-by-Launceston.—A new Wesleyan Mission Chapel has been opened at St. Stephens-by-Launceston. The walls are of local stone with Portland dressings, and the roof is covered with Delabole slate. The building has been erected by Mr. William Burt, contractor, from plans, &c., supplied by Messrs. Wise and Wise, architects, Launceston. The estimated cost is about 340*l.*

Seacombe.—The memorial stone of a new chapel for the accommodation of the United Methodist Free Church congregation at Seacombe has been laid. The total cost of the new chapel, including the price of the site, will be between 800*l.* and 900*l.* It will accommodate 300 worshippers, and is expected to be opened about February next. The contractors for the work are Messrs. E. and R. M'Gloch, Seacombe, the joiner work being entrusted to Mr. J. W. Clarke, Seacombe.

STAINED GLASS.

Upper Norwood.—Two more two-light windows of a series of ten in All Saints' Church, Upper Norwood, have just been filled with stained glass. They illustrate the presentation of Samuel, David slaying Goliath, Elijah restoring to Life the Son of the Widow, and David in the Lions' Den. The artists are Messrs. Mayer & Co.

Norwich.—A new memorial-window has been inserted by Messrs. H. & F. Bullard in the east end of the chancel of the church of St. Michael at Coslany, Norwich. The window is of the Decorated period, and has been copied from the old stones found embedded in the wall during the recent alterations. The central subject is the Descent from the Cross, and above the lights are to be filled with the four Evangelists The glass has been prepared and fixed by Messrs. Heaton, Butler, & Bayne, of London. The architect for the work was Mr. E. Preston Willins, Norwich, the builder being Mr. Hubbard, of East Dereham.

Bishopsbourne.–The memorial window erected in Bishopsbourne Church to Richard Hooker, "that learned and judicious divine," has been unveiled. Richard Hooker was rector of Bishopsbourne at the time of his death in the year 1600; and the only known memorial of him was a very poor slab monument in the south wall of the church, erected in 1633 by Sir William Cowper. The idea of a memorial window originated with the present rector, the Rev. T. Hirst. The glass has been executed in accordance with the style of art prevalent during the fourteenth century. The window is a large one of five lights, and the subjects illustrate incidents from the latter part of our Lord's life, beginning, in the left-hand light, with the "Entry into Jerusalem," and continuing with "The Last Supper," "Agony in the Garden," "Bearing the Cross," "Crucifixion," "Taking down from the Cross," "Entombment," "Resurrection," "Descent of the Holy Spirit," and finishing in the upper part of the centre light with "Our Lord in Majesty." In the lower part of the window is a predella of smaller subjects, forming types of those above. The work has been designed and executed by Messrs. Lavers, Westlake, & Co., of London, at a cost of about £400.

Loughor.—A new window is to be placed in the church of Loughor, in memory of the late Canon Powell Jones, of Llantrisant, and some time of Loughor. The window, representing the Transfiguration, was executed by Messrs. Heaton, Butler, & Bayne, of Covent-garden, from the design of Mr. J. B. Wilson, of Swansea.

PROVINCIAL NEWS.

Exeter.—The first section of the extension of the Devon and Exeter Albert Memorial Museum, which was commenced in August, 1882, is now completed. The extension necessary to complete the whole of the buildings will entail a cost of between 5,000*l.* and 6,000*l.*, but the outlay on the section just completed, which was all the Extension Committee felt justified in undertaking at the time, will be somewhat in excess of 2,000*l.* The buildings just finished complete the north wing, and consist mainly of two large rooms, one on the ground-floor, which will be used for the extension of the library, where space is much needed; while the first floor will form a fine-art gallery. Each of these two large rooms is 65 ft. 6 in. long by 29 ft. 6 in. wide, and both are admirably lighted, the ground-floor by means of side-windows, and the art-gallery from the roof.——A new building has been added to the Devon and Exeter Hospital, in the shape of an out-patient department. The building lies at the end of the hospital near Magdalen-road. The builders are Messrs. Scadding & Son, and the architect is Mr. Medley Fulford.

Newcastle-on-Tyne.—The new Branch Post-office on Newcastle Quayside has been opened for business. The new office occupies the lower part of a block of buildings occupying a site on which several old offices formerly stood. The block of buildings, in which the new post-office is placed, is the property of Mr. Thomas Harper, and the architect was Mr. J. C. Parsons, of Newcastle.

Stockport.—The new building for the Higher Hillgate Liberal Club has been completed and opened. It has a frontage 47 ft. in length to Charles-street, off Higher Hillgate. The outside walls are 17 in. thick, cavitied. Stock brick is used in the front, and stone dressings. The building has been erected from the designs and under the direction of Mr. George Atkinson, architect, of Stockport, who also devised the special arrangements for heating and ventilating. The contractor for the building was Mr. Barlow, and the sub-contractors Messrs. Froggatt & Briggs, timber and stone; Mr. Henry Torrington, plumbing; and Mr. Charles Clarkson, slating.

Hastings.—The foundation stone of a new concrete groyne for the protection of the Fishery, was lately laid by the Mayor. The cost of the work will be about 10,000*l.* Sir John Coode is the engineer. Messrs. Lee are the contractors.

Birmingham.—Before the alteration and extension of the Midland Institute buildings took place, some very useful and costly instruments for meteorological purposes had been made and presented to the Institution by Mr. Follett Osler, F.R.S. These consisted of self-registering gauges for wind and rain, the former showing not only its direction, but its force; and also a barograph, or self-registering barometer. This latter is a most peculiar instrument, having its inches and parts three times lengthened, so that very minute changes of pressure are easily recognised. The alterations to the buildings necessitated the removal of the whole of these instruments, and no place was found convenient in which to re-erect them, as the lofty new buildings overshadowed the vanes. No doubt this ought to have been foreseen, and provision made by the erection of a proper tower. This, however, was not done, and, excepting the barograph, which is an independent instrument, they have all been out of use since, much to the regret of many in the town. Recently it has been found possible to utilise the old monument in Monument-lane, near the reservoir, for the purpose of these instruments. It is hoped the curator will find it convenient to record the daily readings in Paradise-street in the very graphical manner in which they were formerly presented, and which was so much appreciated. Mr. Alderman White signalised his year of office as Mayor by placing a barometer and thermometer, in bronze metal case, at the side of the principal entrance to the Council House, and it would be a very useful addition to the conveniences of the town if some standards of length (from a chain downwards) were placed where our tapes, chains, and rules in every-day use could be readily tested.

The Student's Column.

IRON ROOFS.—II.

BOWSTRING trusses are commonly employed for roofs of large span, especially for those of railway stations. The *bow* consists of an arched *boom* or rafter of **I**-section generally formed of a wrought-iron plate *web*, to which another plate or *flange* is riveted at top and bottom. A roof of this kind is shown by fig. 5, where A, B, C, D, E is the *boom* or curved

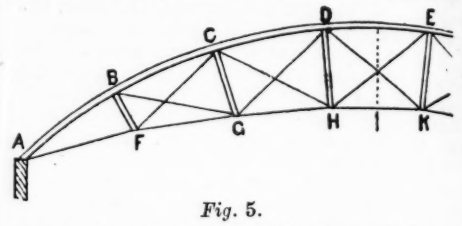


Fig. 5.

rib above described; B F, C G, D H, E K being struts of cast or wrought-iron of cross-section which are in compression, and are attached to the tie-rods A F, F G, &c., by means of couplings; the braces B G, C F, &c., are in tension and may be of round or flat bar iron.

One of the earliest roofs of this kind was that erected in the year 1847 over the Lime-street Station at Liverpool, which has a span of 153 ft., and a rise of 30 ft., the depth of the truss at the middle being 12 ft. The boom is of **I**-section 9½ in. deep and 10 in. wide; the cross-braces C F and D G are omitted in this truss. The trusses are placed 21½ ft. apart and the purlins are 12 ft. apart. The struts B F, C G are wrought-iron of **I**-section 7 in. deep, the tie-rods have a sectional area of 6½ in., and the cross bracing is of round iron 1¼ in. diameter.

A somewhat similar roof of much wider span was afterwards erected over the Birmingham station, of which the span is 212 ft. and the rise 40 ft.; the boom is of **I**-section 15 in. deep and 12¾ in. wide. The struts B F, C G, &c., are twelve in number and are all vertical, each being of cross-section formed of four **L** irons bolted together at top and bottom and made to swell out in the middle by pieces of cast iron inserted to keep them apart. The cross-bracing B G, C F, &c., is of flat bar iron ⅜ in. thick and from 3 in. to 5 in. in depth. The tie-rods A F, F G, &c., are of round iron 4 in. diameter, and screwed into couplings at F, G, H, &c. The depth of the truss is 23 ft. at the middle.

The roofs of the Cannon-street and Charing-cross stations in London are good examples of the bowstring truss, the former having a span of 188 ft. with a rise of 60 ft., and a depth of truss at the centre of 30 ft. This roof has a boom 21 in. deep and 14 in. wide of **I** section; there are eight vertical struts of cross section formed of pairs of **T**-iron bars; the diagonal bracing is of flat bar iron, 6 in. deep and ⅜ to 1 in. thick. The tie-rods are of round iron 5¼ in. diameter.

The Charing-cross roof has a span of 164 ft., a rise of 45 ft., and the depth of the truss at the middle is 20 ft. The boom is 18 in. deep by 12½ in. wide. The vertical struts are of ½ in. **T**-iron, 6 in. by 3 in., and the diagonal bracing of ¾ in. flat bar 4 in. wide. The tie-rods are of round iron, 4¼ in. diameter at the centre, and 4¾ in. at the ends next the wall.

The diagram of strains can be drawn for a bowstring truss in the manner described in the former article, by assuming the lines A B, B C, C D, &c., to be straight lines or chords of the arc, which will be quite near enough for all practical purposes.

In some cases the arched boom or rib is made of sufficient depth to dispense with the struts, a tie-rod being placed across from foot to foot of the rib, and held up by ties suspended from the rib. An example of this kind of roof is to be seen at the Victoria Station, London, where the roof of that over the Chatham and Dover Railway has the rib formed of lattice work with a span of 129 ft. and a rise of 41 ft.; the depth of the rib is 4 ft., and the tie-rod is 19 ft. below the bottom of the rib at the middle, being held up by fifteen oblique ties. The rib is built on the lattice principle, and is divided into thirty-two equal compartments by double struts of **T**-iron at right angles to the arch, between which are cross braces of flat bar iron riveted to the top and bottom booms, which are each formed of a pair of angle irons riveted together. The tie is formed of three bars of flat iron, 4 in. deep, placed side by side, and jointed where the

tension-rods from the rib are attached. One end of the rib is supported on rollers to provide against the effects of changes of temperature. The roof of the Queen-street Railway Station, Glasgow, is on this plan, the span being 170 ft. and the rise 44 ft.; the middle of the tie-rod is 15 ft. above the springing, and is held up to the rib by six suspension rods. The rib is 4 ft. deep, and latticed with a single brace between each strut, on what is termed the "Warren" principle.

Sometimes the arched rib is employed for a roof without any apparent tie to prevent it from thrusting out the supports, as in the case of the great roof of the Midland Railway Station in London. Here the span is 240 ft., which is covered by a rib in the form of a pointed arch, having a rise of 102 ft. The lower part of the rib is shown by fig. 6, and is solid up to D E,

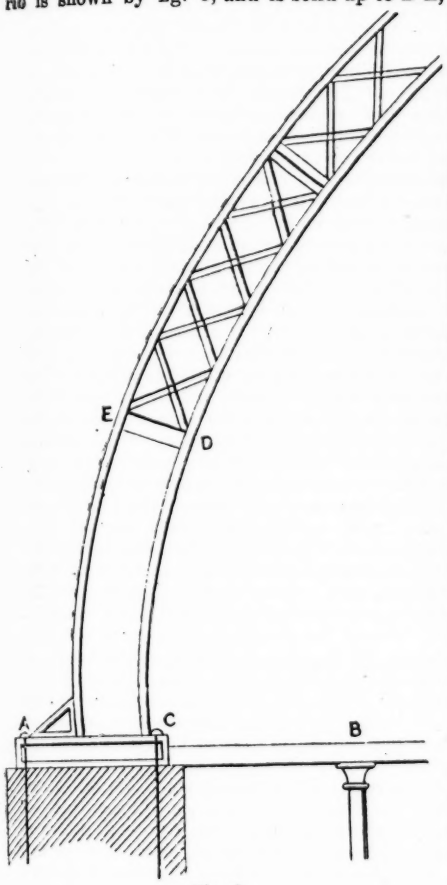


Fig. 6.

and of open lattice work above, with a depth of 6 ft., and width 1 ft. 4 in. The tie, however, in this case is obtained by means of continuous iron girders laid under the railway, and supported on columns in the basement story. These being fixed to the feet of the ribs prevent any thrust from acting on the outer walls. The base is fixed on an iron shoe, A C, bolted down to the bottom of the wall; the horizontal girder, B C, which acts as a tie, being connected with this shoe.

When the metal of the rib in this roof expands by heat the rib will rise at the centre, and fall again as it gets cold. It is calculated that the utmost pressure that can be thrown on this roof will not produce a greater strain than 3½ tons per square inch of section of any portion. The main ribs are placed 29 ft. apart, but there are three intermediate ones between each pair: the purlins are 18 ft. apart and 4 ft. 3 in. deep, formed with top and bottom of T-iron and bracing between; these being fixed between the upper and lower flanges of the curved ribs serve to give them lateral support.

The roof over the St. Enoch station at Glasgow is constructed on the same principle as the above; the arched rib, which is elliptical and has a span of 198 ft., being held in at the feet by a base-plate 13 ft. long carried under the platform and held down by bolts. The rise of this arch is 80 ft. and its depth 5 ft., the construction being that of a "Warren girder." Another roof of similar construction is that over the Manchester central station, having a span of 210 ft. and a rise of 85 ft.

Arched roofs without horizontal ties are frequently erected where sufficient strength of abutment can be obtained to counteract the thrust. The central roof of the Agricultural Hall, Islington, is a good example of this kind of roof and has a span of 124 ft., the ribs being formed of wrought-iron lattice-work and cast-iron struts with purlins of similar construction. Each rib is supported on two cast-iron columns to which the girders of the side galleries are attached and form an abutment for the central roof.

The roof of the Derby Market-hall is another specimen of the same form of arched roof, the span being 86 ft. and the ribs semicircular, their depth being 28 in. and consisting of a web of plate-iron perforated with quatrefoils, riveted to pairs of angle-irons at top and bottom. The purlins are 18 in. deep and of open lattice-work with top and bottom flanges formed of angle irons. The ribs rest on cast-iron columns, and the abutment is formed by cast-iron spandrels which support the side roofs on a level with the springing of the ribs.

The semicircular roof over the central transept of the Crystal Palace, which has a clear span of 104 ft., is so constructed as to cause little, if any, thrust on the abutments. The height of this roof above the ground-floor being over 100 ft. to the springing, and the situation being much exposed to the wind, it was necessary to give it great stiffness. This has been done by making the ribs 8 ft. deep, with double lattice bracing between the booms, which are formed of pairs of angle-irons riveted to a ¼-in. plate, 10 in. wide. A portion of the rib is shown by fig. 7. The rib rests on the top of a pair of cast-iron columns at A and B, united together by a circular cast-iron frame, G, and strongly braced by the cast-iron girders H K, which carry the floors of the galleries. The struts at C D are of wrought iron, and those at E F, of which there are ten in each rib, are of cast iron, and have the purlins attached to them. The purlins are 6 ft. deep, and of lattice-work, similar to the ribs. The main ribs of this roof are 24 ft. apart, their great depth giving them all the stiffness of a girder, and the lateral abutments being only necessary in order to resist the action of the wind when blowing upon one side of the roof.

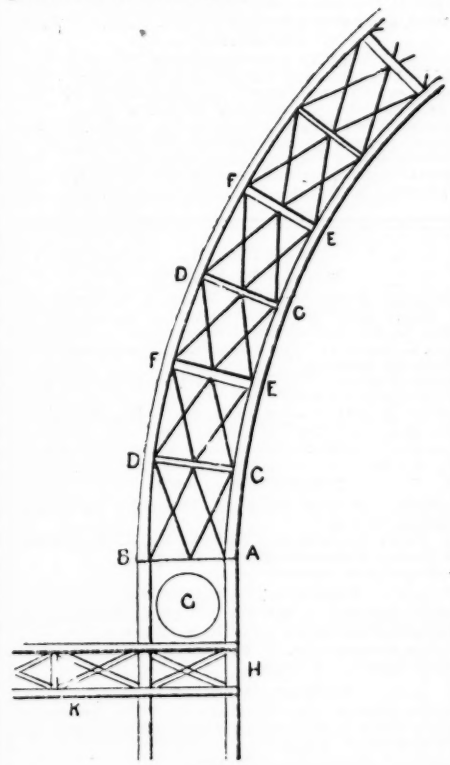


Fig. 7.

In the examples we have quoted of arched roofs, the ribs have had the same depth throughout. This is not always the case, however, the depth at the haunches being often greater than at the crown, which is the correct form of a rib, since the strain is least at the crown and greatest at the haunches. In the arched roof of the Dublin Winter Palace the depth at the haunches is double that at the crown, the span being 50 ft., and the depth at the crown 18 in. The arched ribs of the Paddington Station are also made deeper at the haunches than at the crown, the span of some of them being 102 ft.

Another kind of iron roof sometimes used for covering railway stations, is that formed of horizontal lattice girders thrown across from wall to wall, with longitudinal girders resting upon them. Upon this framework is constructed an ordinary ridge-and-furrow roof, covered with glass or slate. The largest roof of this kind is over the central station, Glasgow, of which the span is 213 ft., and the depth of the girders is 20 ft. A similar roof covers the Citadel Station, Carlisle, where the span is 154 ft., and the depth of the girders 15 ft. The pressure of the wind on a roof of this kind is much less than on one of high pitch.

An article on "Iron Roofs" will be found in the *Builder* for June 21 last, p. 883, vol. xlvi.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

46, Improved Fireproof Building. E. L. Garbett.

The tubular bricks or courses which are here used are made in various curved patterns, and their resistance is strengthened by iron ties. The sections of the moulded brick-tubes are varied according as they are to construct stairs, a floor or terrace, a gabled or a hipped roof. The claims do not set forth any improvement in fireproofing, only dealing with construction according to the inventor's ideas.

2,377, Improvements in Chimney-pots. W. Beddows.

The improvement here is in the fixing of a stay fastened inside or outside of the chimney to which the chimney-pot is afterwards affixed. The security against damage by reason of high winds is very great, as the fastening, although simple, is effective. Projections or snugs are moulded on the ordinary terra-cotta chimney-pot, and holes or slots are made through these to receive the top of the iron stay, which is then either cottered or fastened by a bolt and nut. In building new chimneys the metallic stays can be built in as the work proceeds, the top ends being bent under from the inside to the position of the hole or slot in the snugs or projections on the outside. If the improvements are applied to existing chimneys the pots are placed on as usual, the metallic stays being fixed on the outside of the chimney. The lower ends of the stays are bent and driven into, and the brick or stone work being strengthened and fastened by nails in the various joints in the brick-work of the chimney.

153, Improvements in the Manufacture of Cement, &c. R. Stone.

The object is to effect improvements in the manufacture of cement by crushing and grinding the same while in a red hot state, and also to effect improvements in the machinery to be used in such manufacture. Kilns are built with air-chambers or reservoirs surounding them. Into these reservoirs cold or hot air is pumped or forced by machinery. Special machinery is designed for grinding and crushing the material to a fine powder. Corrugated rolls are first used, then fine grinding rolls, and an adjustable bed plate. An improvement is also made in the form of the pestle and mortar; the mortar being formed of chilled cast iron, with grooves cut in. The pestles are of similarly hard material, solid or hollow spheres, and they work without the inconvenience of lower bearings and their lubrication is avoided.

APPLICATIONS FOR LETTERS PATENT.

Nov. 21.—15,324, G. W. Usill and W. Fyfe, Pipe Joints and Jointing.—15,325, W. Watson, Decorative and Ornamental Designs.—15,334, F. Hobbs, Set Cement for Lead Light Glazing.—15,335, T. S. Ellis, Wall Ventilator.—15,354, J. Holroyd, Construction of Sewers.—15,358, R. Imray, Joints for Lead or other Soft Metal Pipes.

Nov. 22.—15,375, J. Gilchrist, Water-closet Cisterns.—15,385, G. Perrott, Construction of Bakers' Ovens.—15,408, H. J. Haddon, Machinery for Sawing or Dressing Stone.—15,414, S. B. Thomas, Window Sash Fastenings.

Nov. 24.—15,432, A. Lamb, Steam Boiler Flue.—15,441, T. Bear and H. Ransom, Combined Circular Saw, Fret Saw, and Drill.—15,442, R. Walker, Cement Portland Tiles.—15,450, E. C. Murray, Room-to-room Communicator.—15,460, E. De. Pass, Preparing Tiles, Slabs, or Flags in panel form.—15,468, J. Rettie, Cutting and Dressing Stone, Marbles, &c.—15,469, E. Edwards, Slow-combustion Stoves.

Nov. 25.—15,488, Ch. Held, Connexion for Water-closets.—15,489, J. Fagan, Water-closet Cisterns.—15,503, J. M. Brydon, Automatic Sash Fastener and Lifter.—15,525, W. R. Lake, Water-closet Apparatus.

Nov. 26.—15,570, A. J. Ward, Drainage Pavings for Stables, &c.—15,586, E. V. Gardner, Manufacture of White Lead.—15,600, F. R. Baker, Improvements in Cooking Ranges.

Nov. 27.—15,610, W. Ellis and J. E. Ellis, Improvements in Frames.—15,613, F. T. Watts, Water-waste Preventers.—15,628, G. J. C. Marie, Colouring Stone, Marble, and other Materials for Building and other Purposes.—15,634, W. Cunningham, Lime, Brick, and Cement Kilns.—15,635, R. Chantry, Water-waste Preventer.—15,636, H. R. Hiorns, Manufacture of Pipes of Lead, Tin, Composite, and other Metals.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,213, A. Pimm, an Improved Pavement.—14,190, G. H. Lane, Stop for Dowelling Bits.—14,288, H. Swete, Ante-Vacuum Valve for Preventing the Suction of Sewer-gas into Water-pipes and Mains.—14,304, E. Pearson, Water-closets.—14,611, J. Howard, Automatically Regulating the Closing of Doors.—14,888, F. W. Willcox, Improvements in Ventilators.—14,906, H. Sykes, Improvements in Planes.—14,957, W. C. Morton, Improvements in Window Blinds.—14,984, W. Edwards, Improvements in Bolts.—14,125, G. C. Davies, Ventilating Grease Traps for House Sinks.—14,243, F. Herbert, Ventilators.—14,464, T. Birch, Weather Bars for Doors, Windows, &c.—14,721, H. E. Devaux, Manufacture of Cement.—14,918, R. Lawrence, Apparatus for Polishing Granite.—14,974, T. Fraser, Domestic Fire Grates.—15,014, J. Thompson and J. H. Bryant, an Improved Artificial Stone.—15,037, R. Anderson, Flushing Apparatus.—15,074, W. J. Brewer, Daylight Reflector.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

1,792, G. Brodie and J. D. Prior, Improvements in Fire Grates.—1,856, H. H. Lake, Improvements in Soil or Drain Pipes.—2 247, C. J. Lortzing, Manufacture of Asphalte.—2,686, A. B. Johnson, Preventing the Rattling of Window-sashes.—2,984, F. George, Connexions for Lead Pipes, &c.—10,393, C. Lawrence, Ventilating Apparatus.—13,260, H. J. Allison, Improvements in Brick Kilns.—350, H. Forrester, In-laying Wood.—1,960, S. Welman, Water-closet Apparatus.—2,110, A. Drummond, Sash Bars or Astragals.—2,528, J. M. Lamb, Ventilators and Chimney Cowls.—3,243, W. Vincent, Roofing Tiles.—14,239, H. J. Allison, Rendering Buildings Fireproof.—14,368, J. Holroyd and J. Lang, Automatic Flushing Syphons.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

NOVEMBER 26.

By WALKER & RUNTZ.

Wandsworth—St. Andrew-street, ground-rent of 5*l.* 10s., reversion in 80 years	£115
Crichton-street—Ground-rent of 129*l.* 10s., reversion in 80 years	2,802
Westbury-street—Ground-rent of 53*l.*, reversion in 80 years	1,150

NOVEMBER 27.

By WORSFOLD & HAYWARD.

Dover—271 and 272, London-road, freehold	630
27, Biggin-street—Freehold business premises	3,200
Alkham—Two freehold cottages	190

By WALKER & RUNTZ.

Wandsworth—Westbury-street, ground-rent of 137*l.* 10s., reversion in 80 years	2,870
Battersea—Plough-road, ground-rent of 134*l.* reversion in 82 years	2,998
Benham-street—Ground-rent of 109*l.* 2s., reversion in 82 years	2,195
Stockwood-street—Ground-rent of 43*l.*, reversion in 82 years	875
Tritton-street—Ground-rent of 41*l.*, reversion in 82 years	820
Wayland-road—Ground-rent of 66*l.* 10s., reversion in 82 years	1,340
Croydon—Pawson's-road, &c., ground-rent of 81*l.* 2s. 6d., reversion in 79 years	1,735

NOVEMBER 28.

By EDWIN SMITH & CO.

Old Bond-street—No. 38, term 59 years, ground-rent 50*l.*	7,050

By JENKINS & SON.

Deptford—49–60, Butcher's-row, and 1–7, Glebe-court, freehold	1,375
Brockley—16, Brighton-terrace, 86 years, ground-rent 5*l.*	300

By MURRELL & SCOBELL.

Harpenden, Herts—Laburnum Villa, two cottages and 5a. 0r. 1p.	1,170
Belgravia—2, Chichester-street, 49 years, ground-rent 10*l.*	1,090
St. John's Wood—Ground-rent of 21*l.* a year, term 53 years	450
Islington—12, Bemerton-street, 56 years, ground-rent 6*l.*	650
Russell-square—21, Montague-street, 14 years, ground-rent 11*l.* 10s.	640

By ROBERT REID.

Old Kent-road—375 and 307, East-street, and 15–23 odd, Albreton-street, 11¼ years ground-rent 80*l.*	580
Lambeth—18 and 19, Pleasant-row, Duchy of Cornwall lease	120
Kingsland-road—250 and 252, 23 years, ground-rent —*l.*	705
Barbican—Ground-rent of 154*l.* a year, reversion in 74 years	4,200
Bermondsey—25, Spa-road, freehold	1,370
Notting-hill—30 and 32, Ladbroke-grove, 37 years, ground-rent 20*l.*	1,000

DECEMBER 1.

By G. A. WILKINSON.

Milton, Kent—1–5, Glenview-road, and 1 and 2, Parrock-road, and 2 acres of land, freehold	6,150
St. John's Wood—42, Finchley-road, 35 years, ground-rent 16*l.*	1,780
Fortis-green—Coldfall Lodge, freehold	770
Barnsbury-square—West Lodge, 24 years, ground-rent 4*l.*	395

By R. TIDEY & SON.

Islington—61, Oakley-road, 57 years, ground-rent 5*l.* 10s.	500
76, Upton-road—36 years, ground-rent 4*l.*	465

By PARSONS & SONS.

York—One-sixth share of 423*l.* 1s. 9d. arising from fee farm rents	1,010

By PHILLIPS & WEBB.

Kensington—No. 3, Notting-hill-grove, 39 years, ground-rent 10*l.*	£570

By COLLETT & COLLETT.

Notting-hill—70, Bevington-road, 82 years, ground-rent 7*l.*	310

By PETTITT, SON, & BYRNE.

Haymarket—No. 44, the lease, 19 years	520

By BAKER & SONS.

Stratford—Victoria Docks, near, 79 plots of freehold land	3,325

DECEMBER 2.

By W. WEATHERLEY.

Holloway—57, Durham-road, freehold	305
Hammersmith—1, 2, and 3, Waterworks-place, copyhold	340
Southwark—1, Richmond-street, freeho'd	900

By RUSHWORTH, ABBOTT, & STEVENS.

Regent-street—The lease, goodwill, and plant of 36 and 37, King-street, and 4, 6, 7, and 8, Little Marlborough-street, term 5 years	800

By A. & A. FIELD.

Mile-end—Ground-rent of 8*l.* a year, reversion in 23 years	405
Ground-rent of 25*l.* 10s. a year, reversion in 22 years	1,115
Spitalfields—1, Quaker-street, freehold	610
Victoria Park—172, Sewardstone-road, 73 years, ground-rent 3*l.* 15s.	290
Mile-end—116, Jamaica-street, 27 years, ground-rent 4*l.*	290

By DEBENHAM, TEWSON, FARMER, & BRIDGEWATER.

Kennington—104–124, even, Upper Kennington-lane, freehold	5,310
127, 129, and 131, Vauxhall-street, freehold	2,290
1–4, Pledges-place, freehold	650
117–125, odd, Vauxhall-street, and 1–5, Cottage-place, freehold	2,100
Newburn-street—The Rising Sun beerhouse, freehold	650
63–85, odd, Newburn-street, freehold	2,090
1–11, Norfolk-street, and 6–13, Cottage-place, freehold	3,020
96 and 98, Newburn-street, freehold	600
85–115, odd, Vauxhall-street, freehold	5,600
2–16, even, Malmsey-place, freehold	1,390

DECEMBER 3.

By HOBSON, RICHARDS, & CO.

Kentish Town—Oakfield-crescent, a plot of freehold land	95

By C. A. RICHARDS.

Islington—15, 19, and 21, Brewery-road, 68 years, ground-rent 15*l.*	1,005
27, Brewery-road, with forge, stabling, &c., 69 years, ground-rent 10*l.* 10s.	860

By GROGAN & BOYD.

Marylebone—16 and 17, Barrett-street, freehold	2,040
8, Bird-street, freehold	1,010
15 and 16, Gray's Buildings, freehold	1,000
10 and 34, Somerset-street, freehold	5,240
2 and 5, Duke-street, freehold	3,530

DECEMBER 4.

By RICHARD J. COLLIER.

Enfield—An enclosure of freehold land, 7a. 2r. 24p.	900
Dalston—69, Albert-rd., 66 years, ground-rent 5*l.* 5s.	415
Lower Sydenham—Ground-rent of 31*l.* a year, reversion in 97 years	630
Laurel-terrace, ground-rent of 23*l.* a year, reversion in 97 years	505
Albert-terrace, ground-rent of 19*l.* a year, reversion in 96 years	420

MEETINGS.

MONDAY, DECEMBER 8.

Surveyors' Institution.—(1) Resumed Discussion on Mr. Shaw's paper on "Farm Tenancy Agreements in relation to the Agricultural Holdings Act." (2) Paper by Mr. E. Smyth on "The Arithmetic of Compensation for Agricultural Drainage." 8 p.m.

Parkes Museum.—Mr. Ernest Hart on "National Precautions against Cholera." 4·30 p.m.

Society of Arts (Cantor Lectures).—Mr. Harold B. Dixon, M.A., on "The Use of Coal Gas." II. 8 p.m.

Inventors' Institute.—Discussion on the Patent Act, 1883. 8 p.m.

TUESDAY, DECEMBER 9.

Institution of Civil Engineers.—Discussion on Steam Tramways. 8 p.m.

St. Paul's Ecclesiological Society.—Mr. J. D. Sedding "On Modern Ecclesiastical Art." 7·30 p.m.

Anthropological Institute.—8 p.m.

WEDNESDAY, DECEMBER 10.

British Museum.—Mr. W. St. Chad Boscawen on Assyrian and Babylonian Antiquities. 2·30 p.m.

Parkes Museum.—Dr. W. B. Beatson on "Sanitation at a Health Resort." 7·30 p.m.

THURSDAY, DECEMBER 11.

Parkes Museum.—Mr. W. Eassie on "The Systems of Treating Water in Basements for draw-off and other up-stairs purposes." 8 p.m.

Society of Antiquaries.—8.30 p.m.

Society of Arts (Howard Lectures).—Mr. W. Anderson on "The Conversion of Heat into Useful Work." III. 8 p.m.

Society of Telegraph-Engineers and Electricians.—Mr. W. H. Preece "On Electricity in America, 1885." 8 p.m.

Miscellanea.

Highbury.—A parish room for Christ Church, Highbury, has recently been built by Mr. Nightingale, of Lambeth, from the designs of Mr. J. Douglass Mathews, of Dowgate-hill. It consists of a hall to seat 300 persons, with large class-room in rear, and scullery, &c. The interior, as well as the exterior, is faced with yellow bricks and red brick bands. The roof is open-timbered and boarded, with ventilation chamber in upper portion. The total cost will be about 1,400*l.*

The New Railway to Gravesend.—The new line of railway which will give the London, Chatham, and Dover Company direct access to Gravesend has just been completed, and is intended to be opened for traffic at the commencement of the new year. The railway leaves the Company's main line at a point between the Farningham-road and Fawkham Stations, about twelve miles from Rochester, passing for a considerable distance through a chalk cutting, the remaining portion of the line to Gravesend being, for the most part, on embankment. There are three stations on the line, namely, Southfleet, Rosherville, and the terminal station at Gravesend, which is situated within about 150 yards from the margin of the river. In connexion with the line a strong pier has been constructed. It extends out into the river for a distance of 200 yards, where the depth of water is about 20 ft. at low tide, and where vessels of 5,000 tons' burthen will be enabled to come alongside. The pier is opposite the new Tilbury Docks, now in course of construction. The works have been carried out under the superintendence of Mr. Charles Douglas Fox, the engineer, Mr. G. B. Bruce, jun., being the contractor.

Novel Method of Strengthening a Bridge Pier.—When the Chestnut-street Bridge over the Schuylkill river, at Philadelphia, was built, a score of years ago, the foundations of the land piers were laid on piling, and not upon the bed rock, which at this point is about 50 ft. below the surface. The soil is a clayey mud, and almost from the very beginning this slippery mass slid gradually year by year, carrying with it the piles and heavy stone pier above. The stonework shows cracks and fissures, and the settling of the ironwork is apparent. In the hope of preventing any further sliding, a novel plan has been adopted, which consists in sinking four cylinders at an angle of 45 degrees, and extending from the rock to the foundations of the pier. These cylinders are of ½-in. wrought-iron, 8 ft. in diameter, and, when completed and in place, they will be filled up solid with concrete. They are built underground, each segment being about 3 ft. long and 2 ft. high, backed by heavy angle iron on all sides, to allow of bolting together. The scene of operations underground is reached through an iron shaft leading to the surface and covered by an air lock. Operations have to be carried on in compressed air, to prevent the influx of water.—*Iron.*

Antwerp International Exhibition, 1885.—The Lords of the Committee of Council on Education have received information through Her Majesty's Principal Secretary of State for Foreign Affairs that Her Majesty's Consul at Antwerp has been appointed British Commissioner for the International Exhibition which is to be held at Antwerp next year, and that Mr. P. L. Simmonds has been appointed by the Executive Council of the Exhibition at Antwerp their Agent-General for Great Britain and Ireland. The Exhibition in question is a national undertaking under the immediate patronage of His Majesty the King of the Belgians and of the Belgian Government. The President of the Exhibition is H.R.H. The Count of Flanders, and the Vice-President the Minister of Agriculture, Industry, and Commerce. The office of the Agent-General is at 35, Queen Victoria-street, and communications from intending exhibitors should be addressed to him there.

A National Park for New South Wales.—The Government of New South Wales have reserved one of the finest and most picturesque portions of the colony for a national park. It is situated in the Illawara district, and embraces an area of 36,000 acres, having a frontage of 7½ miles to the Pacific Ocean. The park generally may be described as high table-land, from which, at numerous places, excellent and extensive views are obtained of the ocean, Port Hacking, Botany Bay, Sydney, Randwick, &c., with deep gorges, and rich flats covered with beautiful foliage, bordering running streams of the purest fresh water. The high table-lands to some extent consist of comparatively barren stony heaths and of fair to good land, the latter in areas suitable for formation of recreation, review, and encampment grounds, or of plantations of ornamental trees, &c., situated at elevations of from about 350 ft. to about 900 ft. above high-water mark. The park will be made easily accessible from Sydney by the Illawarra Railway, now in course of construction.

The Rowland Hill Benevolent Fund.—The Lord Mayor makes a special appeal to the public on behalf of the Rowland Hill Benevolent Fund, of which he is a trustee, and which has for its object the relief and assistance of Post-Office *employés* distressed from poverty, age, or infirmity, and of their widows and orphans throughout the United Kingdom. When it is remembered that the number of persons employed in the Post-Office is over 53,000, and that cases of distress are very frequent and pressing, the absolute need of some such organisation as this becomes apparent. As a memorial of the late Postmaster-General, it has been determined to set apart a limited portion of the Fund,—to be called "The Fawcett Memorial Fund,"—for the benefit of those *employés* or their widows or orphans who may be afflicted with blindness. Subscriptions for this special purpose should be sent to the Lord Mayor, at the Mansion House.

Bedford.—New class-rooms in connexion with the Harpur Trust Grammar School have been opened by Earl Cowper, the Lord-Lieutenant of the county. The new building contains a useful suite of class-rooms, which have been in use since the beginning of the present year, and provides accommodation for about 300 boys,—a necessary provision for a school that has risen under the present headmastership from 270 in 1875 to 584. Mr. Basil Champneys, the designer of the new schools for girls on the Bromham-road, was the architect of the new class-rooms, and the work was successfully carried out by Mr. Samuel Foster, of Bedford and Kempston.

Tramway Depot at Camberwell.—The Skating Rink in Camberwell New-road, which has been closed and standing idle for some four or five years since the skating-rink mania collapsed, has just been purchased by the London Tramway Company, who are about to erect an extensive carriage depôt and stables on the site. The property, which adjoins the London, Chatham, and Dover Railway, covers an area of about three acres. The materials of the buildings on the site have been sold during the present week. The new buildings will include stabling for about 100 horses.

Ward & Lock's "Technical Journal."—We have received an advance copy of Part I. of this periodical, which is to be a kind of encyclopædic journal of technical science and industrial arts and processes. It promises a great variety of technical information in a popular form. We hope the promoters will not fail by attempting too much. They give with the first number a folding supplement sheet containing "about fifty types of different styles of domestic architecture." These are very bad, and had much better have been omitted. The letterpress seems fairly written.

Exeter.—The Church of the Sacred Heart, Exeter, erected from designs by Messrs. Leonard Stokes, of London, and Charles Ware, of Exeter, was opened on the 18th ult. It is built of Westleigh stone; and for the internal facings Pocombe stone has been principally used. The windows are filled with tinted glass, and the heating is supplied by a Musgrave patent stove. The floors throughout are laid with wood blocks on the patent system of Messrs. Geary & Walker, of Manchester. Exclusive of the site the cost has been about 10,000*l.*

"Old Japanese Art."—This was the subject of a paper read on Tuesday evening by Mr. Robert M. Young, architect, before the members of the Belfast Natural History and Philosophical Society. The subject was discussed by Mr. W. H. Patterson, M.R.I.A. (hon. secretary), Rev. Canon Grainger, Mr. J. J. Murphy, and the chairman, all of whom expressed the indebtedness of the society to Mr. Young for his interesting paper.

A New Process of Photographic Printing.—Messrs. Marion & Co. have just introduced a new photographic printing-paper, by means of which prints can be obtained from a negative during the winter in a few seconds, which would require by the ordinary photo-albumen paper process at least half a day. Thus the new paper puts a new power into the hands of photographers.

Widnes.—A new Catholic day school for boys, in connexion with St. Bede's Catholic Chapel, Appleton, Widnes, and capable of accommodating 400 scholars, has been opened. The school is two stories in height, substantially built, and provided with several class-rooms. The style is Gothic, and the architect is Mr. Krolow, of Liverpool and St. Helens.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Additions to Vestry Hall Buildings	Chelsea Vestry	100 guineas, first; 50 ,, second; 30 ,, third	Feb. 23rd	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Portland Cement	Director-General of Stores, India	*Official*	Dec. 9th	ii.
Construction of Concrete Pier at Newlyn	Newlyn Pier & Harbour Commissioners	J. C. Inglis	Dec. 13th	xx.
Works and Materials for one year	St. George, Hanover-sq	G. Livingstone	do.	ii.
Erection of Inland Revenue Office, Portsm'th	Commissnrs. of Works	*Official*	do.	i.
Works, &c., and Supply of Building Materials	War Department	do.	Dec. 15th	ii.
Fittings	Central Technical Coll.	A. Waterhouse	do.	ii.
Works and Repairs	Lon. & S. W. Ry. Co.	Engineer	Dec. 16th	ii.
Formation of Footpath at Hackney Downs	Met. Board of Works	*Official*	Dec. 17th	ii.
Repairs to Roads and Paths, Finsbury Park	do.	do.	do.	ii.
Enlargement of Huddersfield Passenger Station	Lon. & N. W. and Lan. and Yorks. Ry. Co.	Engineer	Dec. 18th	ii.
Sewerage Works	Darlaston U. S. A.	E. Pritchard	do.	ii.
Alterations to Assize Courts, Hertford	County of Hertford Magistrates	Urban A. Smith	Dec. 19th	ii.
Forming and Laying-out of Cemetery, at Bowling	Bradford Corporation	J. H. Cox	Dec. 22nd	ii.
Boiler-House and Chimney-Shaft	Railway Servants' Orphanage, Derby	A. A. Langley	do.	xx.
Sewerage Works	Tottenham Local Board	Mr. De Pape	Dec. 23rd	ii.
Sewerage	Swansea U. S. A.	R. H. Wyrill	Dec. 31st	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor	Skipton Local Board	Not stated	Dec. 16th	xviii.
Surveyor	Swindon New Town Local Board	180*l.*	Dec. 17th	xviii.
Surveyor	Bury St. Edmnd's U.S.A.	250*l.*	Dec. 21st	xviii.
Architectural Draughtsman	Civil Service Com.	Not stated	Dec. 24th	xviii.

TENDERS.

For the erection of proposed artisans' dwellings situate Chatham-gardens and Nile-street, City-road, for the Joint Estate Trustees of the Joint Parochial Charities of St. Giles's Without, Cripplegate, and St. Luke's, Middlesex. Messrs. Woodthorpe & Hammond, architects. Quantities supplied by Messrs. Franklin & Andrews :—

Dove Bros.	£53,750 0 0
Geo. Shaw	52,607 0 0
Holland & Hannen	51,745 0 0
Thos. Rider & Son	50,488 0 0
Wm. Shurmur	49,986 0 0
W. G. Larke & Son	49,700 0 0
Colls & Sons	49,637 0 0
Martin, Wells, & Co.	49,190 0 0
John Mowlem & Co.	48,438 0 0
Ashby & Horner	47,300 0 0
L. H. & R. Roberts	47,043 0 0
Edward Conder	47,018 0 0
John T. Chappell	46,976 0 0
Wm. Brass	46,777 0 0
Kirk & Randall	46,728 0 0
Ashby Bros.	46,200 0 0
E. Lawrence & Sons	45,204 0 0

For pewterers' work at The Royal Standard, York-road, Battersea, for Messrs. Sansom & Ewington. Mr. H. I. Newton, architect, Queen Anne's-gate, Westminster :—

Heath	£133 0 0
Davidson	125 10 0
Kemble (accepted)	117 0 0

For new public-house, The Compasses, Upper King-treet, Norwich, for Messrs. Steward, Patteson, Finch, & sCo. Mr. Arthur J. Lacey, architect. Quantities by the architect :—

J. Hurn, Norwich	£1,060 10 0
Wilkin & Wilkins, Norwich	1,050 0 0
W. A. Brewster, Norwich	1,015 10 0
G. E. Hawes	1,000 0 0
H. Lacey	992 3 0
S. Sendall (accepted)	947 0 0

For new mission hall, St. Thomas, Heigham, Norwich. Mr. Arthur J. Lacey, architect and surveyor :—

R. W. Bennett, Norwich	£1,125 0 0
G. Hammond, Norwich	1,050 0 0
W. E. Bailey, Norwich	1,037 10 0
J. Hurn, Norwich	998 18 0
Downing & Son, Norwich	998 0 0
G. E. Hawes, Norwich	950 0 0
J. Youngs, Norwich	945 0 0
H. Lacey, Norwich	938 0 0
Wilkin & Wilkins, Norwich *	920 0 0
S. Sendall, Norwich	917 0 0
R. Dawes, Norwich	899 9 6

* Accepted.

For making and draining, with sewer and surface-water drains complete, certain new roads on the Grove Estate, Muswell-hill, for the Imperial Property Investment Company, Limited, 57, Moorgate-street, E.C. Mr. G. H. L. Stephenson, surveyor :—

Pizzey, Hornsey	£5,476 0 0
Bell, Tottenham	4,000 0 0
Wilson, Walthamstow	3,992 0 0
Dunmore, Crouch End	3,829 0 0
Adams, City (accepted)	3,440 0 0

For new house at Moseley, Worcestershire, for Mr. Walter Clarke. Mr. T. W. F. Newton, architect, Waterloo-street, Birmingham. Quantities by Mr. Henry Clere, Bennett's-hill :—

Barker & Sons	£2,689 0 0
F. T. Briley	2,664 0 0
Sapcote & Sons	2,599 0 0
T. Rowbotham	2,559 0 0
J. Bower (accepted)	2,497 0 0

For block of four seven-roomed cottage villas, with iron fencing and Stafford blue brick paving, at Chesham, for Mr. A. Hinson. Mr. T. Foster Woodman, surveyor, St. Albans :—

C. Monk	£774 0 0

For new mahogany and plate-glass double shop-front to premises in the Old London-road, St. Albans, for Mr. T. Hunt. Mr. T. Foster Woodman, surveyor :—

Harris	£115 0 0

For forming a hard road with grips at Betlow, Tring, for the executors of the late Mr. H. Cox. Mr. T. Foster Woodman, surveyor :—

Rowland Bros.	£245 0 0

For the erection of Wesleyan Chapel, Ashbourne-road, Derby. Mr. John Wills, architect, Derby. Quantities by Mr. Robey E. Carpenter, Horninglow-street, Burton-on-Trent :—

W. Fletcher	£4,504 0 0
Edward Wood	3,900 0 0
Isaac Porter	3,900 0 0
Thos. Bakewell	3,850 0 0
John Wood	3,831 0 0
Walker & Slater (accepted)	3,595 0 0

For erection of Wesleyan Chapel, Five Crosses, Frodsham. Mr. John Wills, architect, Derby. Quantities by Mr. Robey E. Carpenter, Horninglow-street, Burton-on-Trent :—

J. Littler (accepted)	£1,400 0 0

For the erection of two houses in Pemberton Gardens, St. John's Park, Upper Holloway. Mr. Marshall N. Inman, architect, 7, Bedford-row, W.C. :—

	One house.	Two houses.
W. Sayers	£995 0	£1,888 0
Horner	836 0	—
G. Pearce	775 0	—
G. Stephenson	760 0	1,431 0
Price & Stephenson*	750 0	1,370 0

* Accepted.

For the restoration of Cannington Church, Somerset. Messrs. Down & Son, architects, Bridgwater :—

Pearce, Minehead	£1,625 12 0
Kitch, Bridgwater	1,600 0 0
H. W. Pollard, Bridgwater	1,480 0 0
Merrick & Son, Glastonbury	1,475 0 0
Harris & Tapscott, Bridgwater	1,467 10 0
Spiller, Taunton (accepted)	1,450 0 0

Accepted for new shop-front for Mr. Alfred Hays, New Bond-street :—

F. Sage & Co.	£210 0 0

Accepted for new shop-front and fittings at shop under the Royal Exchange, for Messrs. E. Dent & Co. :—

F. Sage & Co.	£118 10 0

For the erection of warehouse and stabling for Mr. Robert Seely, Bailgate, Lincoln. Messrs. Bellamy & Hardy, architects. Quantities suplied :—

Codd & Eberger	£580	0	0
Cowen & Lansdowne	465	0	0
J. Greenwood	450	0	0
M. W. Hampshire	439	0	0
Binns & Co.	425	0	0
Martin & Sims	419	0	0
J. M. Harrison	408	0	0
S. & R. Horton	4 1	0	0
H. S. & W. Close	400	0	0
J. Goy	386	0	0
J. B. Harrison (accepted)	372	0	0
Crosby & Sons	372	0	0

For erecting new mission hall and schools, Mere-road, New Evington, Leicester. Mr. W. S. Burton, architect and surveyor :—

E. Walker	£967	15	0
J. Ellingworth	943	0	0
J. Marston	937	0	0
Tyers & Yates	924	0	0
J. Priddett	921	0	0
R. H. G. Barnett	920	0	0
Duxbury & Son	913	0	0
T. C. Tyers	910	0	0
J. Mason	907	0	0
Cunningham & Palmer	905	0	0
J. Holmes	887	12	0
A. Woodcock	886	0	0
T. Johnson	883	0	0
Richardson & Son	870	12	0
J. Stephens	868	0	0
N. Elliott	865	0	0
J. J. Hallam	859	17	6
C. Bass	8 7	0	0
C. Wright (accepted)	800	0	0

For town-hall and market-place, Carlow. Mr. William Hague, architect, Dawson-street, Dublin. Quantities prepared by Mr. Frederick Morley, Commercial Buildings, Dublin :—

Patrick Nolan, Monahan	£3,740	0	0
J. Pemberton & Son, Dublin	3,300	0	0
Wm. Dodd, Beckett, & Co., Dublin	3,220	0	0
Bernard Brady, Bray	3,168	3	0
Thos. & J. Pemberton, Dublin	2,898	0	0
Geo. J. Crampton, Dublin	2,853	0	0
Thos. Tighe & Son, Dublin	2,790	0	0
John Redmond, Wexford	2,681	8	9
Daniel Carbury, Athy	2,550	0	0
Michael Robinson, Carlow	2,486	0	0
Wm. Connolly & Son, Dublin *	2,327	0	0
Breslin Bros., Dublin	2,300	0	0

* Accepted.

For the erection of dwelling-house and shop in Regent-street, New Swindon, Wilts, for Mr. Coroner Baker. Mr. William Drew, architect, Swindon. Quantities by the architect :—

Barrett	£385	0	0
Williams	379	0	0
Wiltshire, Swindon (accepted)	360	0	0

For works to be done in fitting-up new loose boxes, &c., at Stratton St. Margaret, near Swindon, Wilts, for Mr. Edward Burrow. Mr. William Drew, architect, Swindon :—

Williams	£210	0	0
Phillips	205	0	0
Barrett	195	0	0
Colborne	195	0	0
Wiltshire	174	0	0

For the erection of new house, &c., Ladyswood, Shenton, Wilts, for Sir Thomas Dancer, bart. Mr. W. Ravenscroft, architect, Reading. Quantities supplied by Messrs. Cooper & Sons, Reading and Maidenhead. General work, including deal dado in hall and vestibule :—

Searle, Reading	£5,911	0	0
Rider & Son, London	5,618	0	0
Higgs, Goring	5,550	0	0
Smith & Light, Chippenham *	5,410	0	0
Barrett, Swindon	5,118	12	0
Margetts, Reading	5,109	0	0
Brock & Bruce, Bristol †	5,090	0	0

* Received too late.
† Accepted subject to a few modifications.

Accepted for the reconstruction of Buecker's Hotel, Finsbury-square, for Mr. G. Hohly. Mr. J. Groom, architect, 1, Broad-street Buildings :—

J. R. Hunt	£2,650	0	0

[No competition.]

For making-up two roads for the Wandsworth District Board of Works, including channelling, kerbing, and pathways. Mr. J. T. Pilditch, C.E., surveyor :—

	Beaufoy-street.		Wickersley-road.	
Bedall Bros.	£648	0	£577	0
Treherne	620	0	550	0
Turner & Son	615	0	540	0
J. Neal	615	0	540	0
B. Cooke & Co. (accepted)	604	0	533	0

Accepted for new shop-fittings, alterations, and repairs to No. 42, Clapham-road, for Mr. W. S. Chapman :—

W. Wilson (late Wilson & Exton), Aldersgate-street	£434	0	0

For alterations to the Ranelagh Arms, Old Ford-road, for Mr. N. Argent. Mr. Edwd. Brown, surveyor, Hanbury-street, Spitalfields :—

S. Salt	£495	0	0
Kiddle & Sons	495	0	0
J. Hughes	430	0	0
C. Marr	405	0	0
S. Hawkings (accepted)	379	0	0
A. Smith	342	10	9

For alterations at the Salmon and Compasses, Dorrington-street, Leather-lane. Messrs. Rayment & Webb, architects. Quantities by Messrs. Batstone Bros. :—

W. S. Burt	£1,100	0	0
F. & F. J. Wood	1,035	0	0
W. Oldrey	980	0	0
Burch & Co.	963	0	0
Jackson & Todd	939	0	0
Dixon & Jones	895	0	0
J. Walker	849	0	0

For enlargement of Schools at Laystall-street, Gray's Inn-road, for the London School Board. Mr. E. R. Robson, architect :—

D. Kearley	£10,236	0	0
J. Williams	9,928	0	0
F. & F. J. Wood	9,917	0	0
W. Bangs	9,435	0	0
G. S. Pritchard	9,397	0	0
W. Shurmur	9,387	0	0
Turtle & Appleton	9,357	0	0
J. Goodman	9,333	0	0
Holloway Bros.	9,253	0	0
Lathey Bros.	9,233	0	0
J. H. Johnson	9,193	0	0
T. Evans	9,166	0	0
Wm. Brass	9,120	0	0
Kirk & Randall	9,080	0	0
H. L. Holloway	9,079	0	0
Wall Bros.	9,035	0	0
Stimpson & Co.	9,008	0	0
E. C. Howell & Son	8,975	0	0
Scrivener & Co.	8,950	0	0
T. Oldrey	8,890	0	0
Atherton & Latta	8,850	0	0
C. Wall	8,801	0	0
C. Cox	8,800	0	0
S. J. Jerrard	8,579	0	0

For erection of new schools at Ecclesbourne-street, Islington, for the London School Board. Mr. E. R. Robson, architect :—

R. Kirby	£14,276	0	0
Dove Bros.	13,906	0	0
W. Downs	12,693	0	0
W. Brass	12,622	0	0
J. H. Johnson	12,422	0	0
J. Grover	12,373	0	0
J. Goodman	12,222	0	0
Scrivener & Co.	12,136	0	0
T. Oldrey	12,100	0	0
H. L. Holloway	12,093	0	0
Wall Bros.	12,742	0	0
W. Bangs & Co.	11,998	0	0
J. R. Hunt	11,995	0	0
W. Shurmur	11,970	0	0
H. Clark	11,957	0	0
Kirk & Randall	11,944	0	0
W. & F. Croaker	11,934	0	0
Stimpson & Co.	11,924	0	0
C. Wall	11,891	0	0
E. C. Howell & Son	11,837	0	0
W. Tongue	11,819	0	0
Atherton & Latta	11,695	0	0
S. J. Jerrard	11,589	0	0

For fitting-up the new wing of the Chelsea Infirmary, Cole-street, Chelsea, with hot-water, warming, and supply apparatus, &c., for the Guardians of St. Luke's, Chelsea. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities not supplied :—

Pennycook & Co.	£548	3	0
Clark, Bunnett, & Co.	500	0	0
W. G. Cannon	498	10	0
W. S. Fraser & Co.	475	0	0
J. & F. May	447	0	0
Strode & Co.	430	0	0
R. Crane	427	0	0
Clements, Jeakes, & Co.	266	13	0
J. Knight	407	7	0
Goddard & Massey	398	5	6
Kinnell & Co.	360	0	0
Bradford & Co., High Holborn *	296	14	0

[Architect's estimate, £500.]
* Accepted.

For alterations and additions at Green-hill Farm, Harrow. Mr. E. Tyler, architect. Quantities by Mr. W. Barnett :—

Rider & Son	£2,900	0	0
Stimpson & Co.	2,886	0	0
J. Chappell	2,860	0	0
E. Lawrence	2,792	0	0
J. O. Richardson	2,659	0	0
W. Shurmur	2,484	0	0

For stables, &c., Laburnum-street, Kingsland. Mr. G. Smith, architect :—

Chessum	£1,542	0	0
S. Hayworth	1,374	0	0
Allard	1,300	0	0
Forest	1,287	0	0
Stimpson & Co.	1,249	0	0
T. Boyce	1,245	0	0
W. Shurmur	1,179	0	0

For the erection of the Shipwrights' Arms public-house, Bermondsey. Mr. G. Treacher, architect :—

Harber Bros.	£2,973	0	0
W. Shurmur	2,941	0	0
Hill	2,909	0	0
Canning & Mullins	2,890	0	0
J. Beale	2,798	0	0
G. S. Pritchard	2,695	0	0
Jackson & Todd	2,684	0	0
Parker	2,479	0	0

Special Notice.—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than four p.m. on Thursdays.

TO CORRESPONDENTS.

C. S.—E. F., Düsseldorf.—Dr. H.—H. H.—C. L., Paris (thanks).—T. C. M.—Ex-Architect (the matter has got quite beyond the stage at which your letter was written).—M. P. B.—A. B. & Son.—J. F.—C. W. (we cannot advise, especially without knowing all the circumstances of the purchase of the bricks, &c. It is a legal question really).—G. H. A.—J. M.—J. B. F. (too exclusively parochial).—W. F. P. (somewhat wide of mark).—D. R. D.

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read a public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PUBLISHER'S NOTICES.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS,
Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.
Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.
FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.
*** Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to
DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher No. 46, Catherine-street, W.C

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [Advt.

Dry Corsham Stone.
150,000 FEET CUBE.
PICTOR & SONS,
BOX, WILTS.
[Advt.

Doulting Freestone.
THE CHELYNCH STONE. The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.
THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.
HAM HILL STONE.
Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.
Prices, and every information given, on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, near Ilminster, Somerset.
London Agent — Mr. E. WILLIAMS,
16, Craven-street, Strand, W.C. [Advt.

Doulting Free Stone
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [Advt.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [Advt.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [Advt.

J. L. BACON & CO.,
MANUFACTURERS OF IMPROVED
STEAM AND HOT-WATER APPARATUS,
FOR WARMING AND VENTILATING
Private Houses, Churches, Schools, Hospitals, Manufactories, Greenhouses, &c.
OFFICES AND SHOW-ROOMS:—
No. 34, UPPER GLOUCESTER PLACE, DORSET SQUARE, LONDON, N.W.
And at DUBLIN, BELFAST, GLASGOW, and NEWCASTLE.
Illustrated Pamphlet on "Heating" post free.